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MONTANA OUTDOORS

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THE COVER

The front cover (photo by Tom Warren) sets the stage for a lengthy emphasis on the development of eastern Montana coal. Look inside and watch future issues for a detailed account of our number one environmental issue.

Perch mean winter fun for many Montana families. But to others they mean less trout fishing. The back cover (photo by Bill Schneider) leads to a story on page 27.

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ASHTON'S

a livable environment for WILDLIFE is a quality environment for MAN

WHAT WOULD YOU DO?

A MAJOR PORTION of my life has been with the Department of Fish and Game. For over 30 years I have walked, traveled by horseback, car, truck, snowmobile and boat or flown by airplane and helicopter over almost every square mile of this great state. In all my travels, I have yet to find a man without some interest in hunting or fishing.

While most Montanans still enjoy the sports, some have grown tired of their side effects. Outright condemnation of these recreational pursuits is rare and usually the result of the actions of an unconscientious trespasser who has failed to observe the common courtesy most of us expect of each other.

Montana does not have enough public land to satisfy the needs of all hunters and fishermen. Therefore, we must learn to comply with the rules of the fellow controlling two-thirds of the total land area—the private landowner. We can holler and raise hell about the low-cost rental rates on state or federal lands and bring up all the other hangups that may or may not be relevant. But nothing will replace the calm, thoughtful approach that should have been used in the first place. What would I do if I were the landowner? What would I expect of the fisherman or the hunter?

We must first realize the landowner wants to hear you ask if you can enter his domain. And then he has the right to expect what you expect of your guests at home or at a lawn party—respect, a friendly attitude and at least a smile of gratitude.

The recent MSU-U of M football game (Bobcats won) and a fishing or hunting trip are both planned recreational pursuits. Do we approach them the same way?

While we all pay taxes to support both universities and some of us contribute to the Alumni Club and the Century Club, none of us expected to get into the game (on public property) without "asking"—by making arrangements for a reserved seat or general admission. Some called too late and were turned down, but no one threatened punitive action. We expect it and respect the system.

Why then do we insist on a different standard of admittance from a private landowner? Perhaps we should count our blessings that more do not charge for the reserved seat or general admission. Make friends—write, call, visit, communicate in some way—long before your hunting or fishing trip starts. I think you'd be surprised at the difference in reception you would get compared to a rap on the rancher's door at 5 a.m.

Many letters and phone calls have been coming into this office about the poor reception hunters are receiving from private landowners this year. Many believe the department should do something to assure them a place to hunt. But few, if any, are willing to blame themselves and take steps to avoid a re-occurrence.

This year, as is always the case, there were many ill feelings towards nonresident hunters. Under Montana law, we limit out-of-staters to 10 per cent of the hunting. We allow nonresident deer and antelope hunting in only those areas where residents fail to make the necessary harvest. Although only 10 per cent of the hunters are nonresident, they account for about 60 per cent of our license income. So they do more than their share to assure the continuance of healthy wildlife populations in Montana.

Some hunters indicated the ranchers were reacting to President Nixon's order banning poison for coyote control on public lands. If this was your case, did you offer to assist them some weekend next spring during the lambing period? The department has contributed to the coyote control program from your license fees, but a personal effort will do more to win friendship.

No one expects a hunter to grovel and beg for admittance. But landowner/sportsman relations will only deteriorate if every user of private lands for recreation does not become involved with the landowner on a man-to-man basis.

Don L. Brown

Don L. Brown, Director
Department of Fish and Game

BY DR. HAROLD D. PICTON

when a preserve isn't really a preserve

—During warmer months elk thrive (far left) on most ranges. (F&G photo by D. L. Flath) The Sun River Game Preserve (center), even with its shortage of quality habitat for big game in winter, does offer some summer sustenance for wildlife. Even though this bull (upper right) endured past winters and warmer seasons, he finally yielded to the hardships of a Montana winter. Natural predators have already started to slowly gnaw away on the fallen majesty. (photo by Jack Jones) Sometimes the melting snows of spring find elk (lower right) in such poor physical shape that they must spend the entire summer just replenishing themselves and not preparing for the upcoming frozen fury which, this time, may mean their death.

LACKING THE TOOLS of modern game management, the Montana legislature created the Sun River Game Preserve in 1913. Although all other large legislative-created preserves were later abolished and their management turned over to the Fish and Game Commission, the Sun River Game Preserve (SRGP) still exists.

Game management problems stemming from the protected elk are obvious and serious. But the Fish and Game Commission is powerless to correct the basic problem—the preserve itself. What the legislature creates, it must "un-create." No one else can.

The Sun River Game Preserve, a 199,661-acre, mountainous back country area, has the Divide as its western boundary and the North and South forks of the Sun River as its eastern limits. It's roadless and extends into the Bob Marshall Wilderness. The Lincoln-Scapegoat Wilderness Bill, passed in 1972, extended wilderness protection to all but a fraction (1.7 per cent) of the preserve. Only the Benchmark road comes near the preserve boundary, all other road heads being at least six miles away. Most of the area is rugged and heavily timbered—only about 11 per cent can be considered even marginal winter range for elk and bighorn sheep.

Unfortunately, the game *preserve* has been confused with the Sun River Game *Range*, some six

preserves continued

miles away on the edge of the plains. (The game range is 20,000 acres of state-owned and leased land obtained in 1947 as elk winter range.) No major management changes involving the game range are needed or proposed.

The SRGP arrived as a bolt out of the blue in 1913 with passage of a bill introduced by a Choteau senator. Opposition was mobilized too late, and it was 1915 before the Choteau and Augusta rod and gun clubs, the Great Falls Commercial Club and the game wardens were petitioning against the preserve.

The idea of a preserve apparently had its start in 1910 when proposals were circulated to remove cattle from the back country. Some contended cattle competed severely with elk. After the preserve was created, disagreement existed over the size of elk herd it supported. The first census in 1913 located 965. The herd increased rapidly—four years later the count was 1,708. Local citizens and Forest Service (FS) officials knew the elk herd threatened cattle grazing, but the preserve was an established fact. Neither cattle or elk numbers were reduced, and the depleted range resulted in a die-off of elk and a subnormal livestock calf crop in the winter of 1921-22.

Although hunters harvested increasing numbers of elk (600 in 1925) around the preserve's borders, the herd kept growing. Some moved across the Divide; the Spotted Bear Game Preserve was created in 1923 to protect those migrants. But the tale of woe intensified: up to 70 per cent loss of bighorn sheep in 1924-25; another sheep die-off in 1927; a major elk die-off in the winter of 1929-30. The FS recommended larger harvests and abolition of part or all of the preserve.

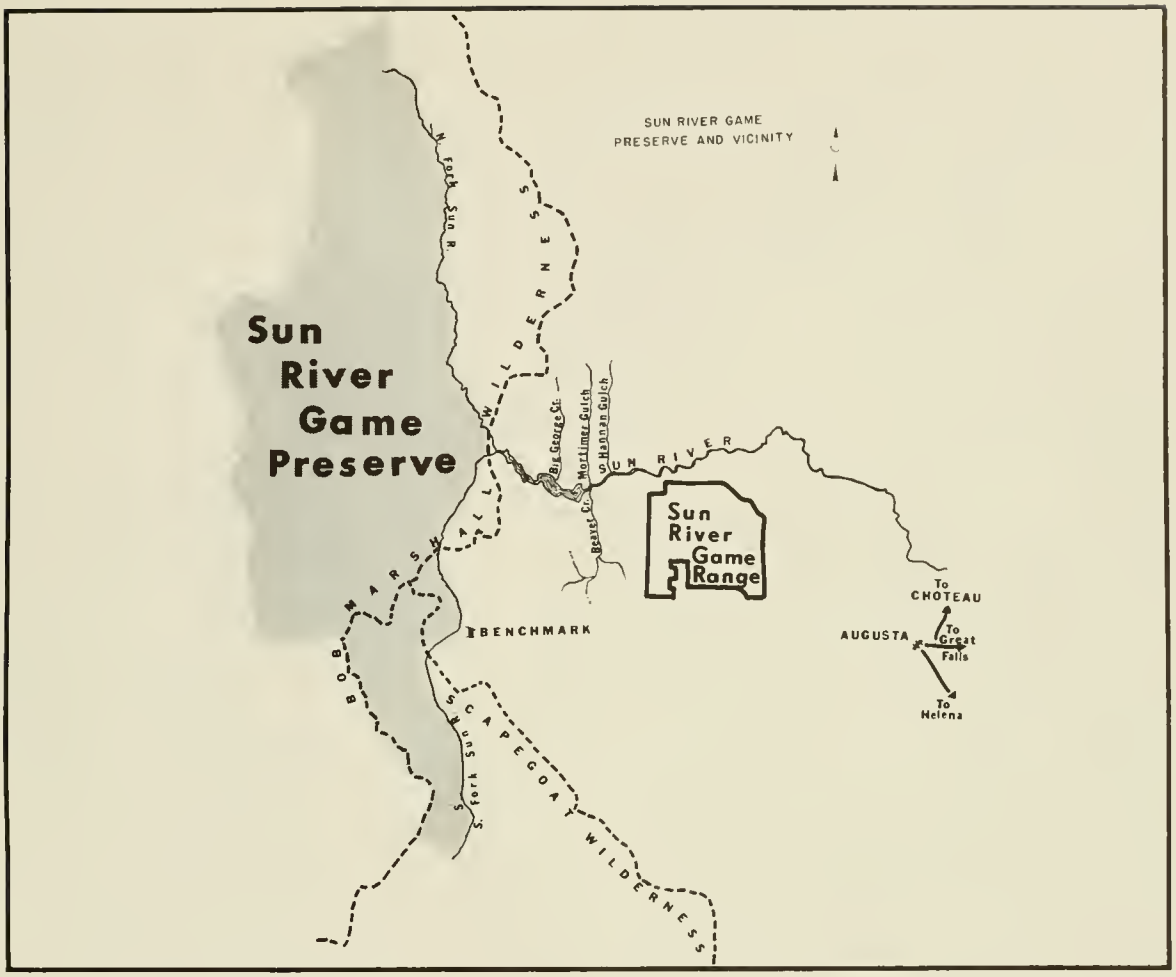
In 1934, the predictions made by a forest supervisor 20 years before came to pass, and the last cattle were taken from the North Fork of the Sun River. Forty-five years of back country cattle grazing ended; the Sun River Primitive Area (the forerunner of the Bob Marshall Wilderness Area) was established.

But the familiar pattern continued: a bighorn sheep die-off in 1932; elk winter losses in 1935; a sheep die-off in 1936. Forest Service biologists and the U.S. Biological Survey (forerunner of the Fish and Wildlife Service) continued to study the area and to recommend a size reduction for the preserve. About this time the Montana Fish and Game Department became less of a political pawn and more active in the area's management.

A touch of irony colors the preserve's history. In the 30's, the situation in the neighboring South Fork of the Flathead drainage was also serious with large winter losses in spite of heavy hunter harvests. In 1936, P. G. Gutensohn, a Fish and Game Commissioner from Kalispell, made a trip into the Spotted Bear Game Preserve to confirm the situation. He reported the preserve had outlived its usefulness, and it was abolished. For the last 40 years, this area (similar to the SRGP) has furnished quality hunting and healthy game herds.

Back at the SRGP, efforts continued to increase the elk harvest, but the back country range was so depleted, the elk had moved to private land east of the mountains. This angered local ranchers who didn't like the idea of hundreds of elk taking their winter forage. The rancher-elk conflict was not resolved until the Fish and Game Commission

For many years, cattle severely competed with elk for the limited winter range in the Sun River Game Preserve. But even after domestic livestock was removed, the range continued to deteriorate from overuse by an expanding elk herd. Professional wildlife managers (federal and state) believe the solution is the abolition of the preserve and at least part of the area opened to sport hunting. (F&G photos)



purchased the Sun River Game Range in 1947. Elk, sheep and deer die-offs were still a regular occurrence in the 1940's and biologists, now of the Montana Fish and Game Department, repeatedly recommended abolition of at least part of the preserve to increase area hunting opportunities. By now the Sun River area supported 17 per cent less elk than in 1930 because of depleted range.

The elk responded to the new wintering area (Sun River Game Range) and shifted to it as their winter resort. Several years of low elk harvests in the early 1950's permitted the herd to build again, but by 1955 range overuse was again apparent, so the hunter take was increased. Since that time the elk herd using the game range has been in approximate balance with its habitat.

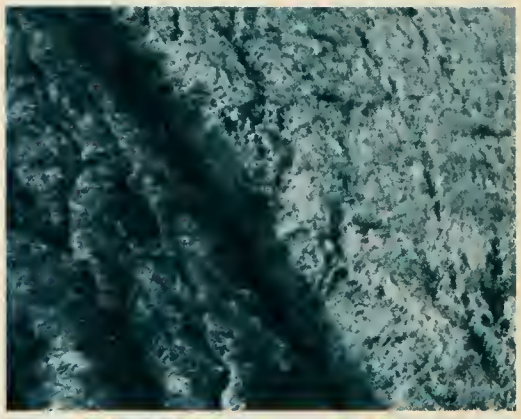
Elk tagging began in 1937, and in 1960, data accumulated over the years was analyzed. Several trends were noted—during periods of bad range, the elk moved out of the Sun River drainage, and an increased percentage of the elk were summering in the game preserve and not migrating to the game range until very late in the hunting season. Because of this analysis, range surveys on the preserve were updated, and an intensive, six-year study started.

The study only confirmed suspicions—the elk summering in the preserve were not being effectively harvested and as a result, these elk were exceedingly unproductive. Once again, sound management objectives dictated the preserve's abolition.

Range surveys in the early 1960's indicated browse plants in the preserve's wintering areas were severely overused. Grass transects (routes through the preserve checked regularly for grazing conditions), rated fair in the early 1960's, rate as poor today. Grass on these game preserve transects has been far more heavily used than in any other range area of the Sun River.

In addition to elk, the SRGP contains consider-

Harold Picton became interested in the Sun River Game Preserve 15 years ago when he was the department's management biologist in Great Falls. Although he left Fish and Game in 1961, he has continued his study of the Sun River area. Picton is an associate professor of zoology at Montana State University, Bozeman. He received B.S. and M.S. degrees in wildlife management from Montana State University and a Ph.D. degree in physiology from Northwestern University, Evanston, Ill.



Although the Sun River area hosts one of the West's largest bighorn sheep herds (left), very few reside in the preserve itself because of a lack of quality range. As with elk, overuse of winter range (upper right) has caused periodic die-offs (lower right) of bighorns. (F&G photos)

preserves continued

able other game resources. A static population of perhaps 200 mountain goats exists there. Malnutrition, winter losses and low production of young are the facts of life for this goat herd. A few bighorn sheep (perhaps 25) also live in the preserve. With elk's increased use of the area by elk, this herd of prized bighorns may drop to zero. (But this herd should not be confused with the bighorns that roam the Sun River area outside the preserve, one of the largest populations in existence.) Grizzly bears also haunt the preserve. However, they are apparently as abundant, or more abundant, in the Sun River area outside the preserve.

What is the preserve like? It is rugged, varying in altitude from 5,000 to 8,000 feet. At least 60 per cent of it is heavily timbered, much of which is over-mature causing considerable deadfall — a hindrance to any potential hunters. But the 312 square miles in the game preserve could still provide quality hunting for a variety of game species, improving the conservation of these herds, eliminating range overuse and increasing herd productivity.

Abolition of the SRGP simply provides that this area be treated like the rest of Montana. The area would not necessarily be open to hunting; that would be the prerogative of the Montana Fish and Game Commission. Of course, history and present circumstances do indicate at least a major portion of it should be hunted.

An American proverb says advice is worth what you pay for it. The advice of four generations of highly trained biologists has been ignored in favor of free-wheeling emotion.

Here lies the factual record. Now, it's up to the Montana sportsman to determine what represents good conservation and what is a continued step backward.

ABOUT THOSE DRIED UP, UGLY, OLD, USELESS CHRISTMAS TREES

T'was the night before Christmas when all through the house
Not a creature was stirring, not even a mouse;
The stockings were hung by the chimney with care,
In hopes that Saint Nicholas soon would be there;

Now St. Nick has come and gone leaving presents, good cheer, fond memories and probably a dried up Christmas tree.

Of course, if you had decided on a "permanent" tree that can be used year after year or on a live potted plant, you wouldn't have this problem.

Many families will discard their tree beside the trash can and let the city garbage men worry about its disposal. That can hardly be called a solution.

A basic answer would be to redecorate the tree with edibles and set it outside in a snowbank for the birds. But that still leaves the fundamental problem of "what to do with the tree when its obvious uses are exhausted."

For starters, it can be chopped up, left to dry and then burned in the fireplace (very aromatic) or added to a local landfill. It can be replaced with an artificial tree that can be used year after year (an idea for next year) or fed into a chipper and used for mulch. But buying an artificial tree and replacing it every five years (creating solid waste) probably does more damage to the environment than discarding an evergreen each year.

Or hauled to an eroded gully, with the landowner's permission, of course. There, the tree will help stop soil erosion. You might even offer to pick up the left-overs at Christmas tree sale stands.

And those suggestions are just for cut trees. Why didn't you buy a rooted tree at the local nursery? It could have gone outside in a tub or been kept until spring and then planted. Planted, you would have added to your yard's landscape and potted, you would have purchased a tree that can come indoors for the holidays for several years to come. A point to remember for next year.

And remember, too, an uprooted tree that's brought indoors faces two shocks: the injury done to its roots in digging and the sudden exposure to a warm, enclosed environment. Either shock could kill it. So leave the tree outdoors in a protected area for several weeks. Then move it to a cool garage or an enclosed porch or put it near the house next to a warm wall away from wind for several more weeks before bringing it indoors. When Christmas is over, move the tree outside in stages, too, allowing it to re-adjust to colder temperatures.

If you're thinking about a potted plant for next year, shop before the holiday rush. A tree planted from several months to a year before the holidays will have healthy feeder roots and will better withstand the moving shock. You might mulch the container while the plant is outside. And inside keep a potted conifer in as cool a place as possible and away from heating elements. Water it regularly and place it in a room near sunlight.

But since the tree will spend time outdoors, either permanently or as a potted plant, be sure to pick a tree species native to the area. (Here in Montana that isn't much of a problem.) A native product will be more resistant to pests because it has lived in the area all along, has adapted to the insects of the area and is less likely to require pesticides. It is also adapted to the climate and won't require any special care.

Have the city plant your next Christmas tree in a park if you're an apartment dweller. And look into the possibilities of renting, yes, renting, a potted tree for next year.

But this year, keep on giving after the holidays. Give to the environment as well. Make use of your Christmas tree after the tinsel and lights are put away.

AIR POLLUTION

Researchers from the Council of Environmental Quality say the absence of air pollution would be as advantageous as a cure for all kinds of cancer.

LET BUS DO DRIVING

To reduce air pollution, the Tokyo government has stopped transporting its 70 top officials to and from work in automobiles and has suggested they use the buses instead.

recycled paper

only if everyone cares

Landowner/recreationist relations are a constant worry of this department as well as all Montana sportsmen and landowners. Each year incidents seem more frequent and less appetizing, and too many feel it will get worse before it gets better.

This year was no exception. But, for the first time, there was "a bright light at the end of the tunnel." There were, in fact, three different (and equally worthwhile) examples of "how to maintain smooth landowner/recreationist relations and keep everyone happy."

The first was a cooperative agreement between a group of private landowners and this department that has possibilities for improving landowner/recreationist relations on a statewide basis.

In the square Butte area of north central Montana, some 125,000 acres of private land remained open to hunting and fishing this year because sportsmen followed the provisions of the agreement.

Specifically, the agreement asked that hunters stay on certain designated roads (many roads were closed) and that firearms not be discharged around buildings. Or, in short, landowners only requested hunters to walk instead of ride and to be careful.

That seems like a fairly small request in view of today's rapidly rising recreational force and ever-decreasing amount of land available to average sportsmen.

Probably unknown to some, the agreement may have a fringe benefit that could possibly equal its original purpose—improved landowner/recreationist relations. That is an emphasis on quality hunting and a de-emphasis on vehicular-oriented hunting. Much of today's criticism of hunting comes from those who had an unpleasant experience with an off-road vehicle of some type. Many sportsmen approve of the non-mobile hunt and condemn those who depend on the internal combustion engine to get their game. Perhaps a series of agreements such as this one will be the nudge that is needed to make all hunting what it should be.

The second example (we're not listing in order of importance) was sparkplugged by a Rosebud County rancher, Don Bailey. He designed a written application for hunters to sign before he grants permission to hunt. The form insures that the hunter will not mistake his sport for a right instead of the privilege it is and that he will respect that privilege and the land.

Any attempt to falsify or conceal information by the hunter voids the permission and brings an automatic refusal of future requests. Other facets of the form (which the hunter must complete or hunt elsewhere) include:

—The applicant must check out after the hunt and reveal number and kinds of game taken.

—He must report any vandalism.

—He must give a description along with license number of any other vehicles he comes across while on the landowner's property.

There's been considerable interest in Bailey's application and a few other landowners are giving it a try.

And thirdly, two other ranchers near Whitewater have another seemingly successful and certainly unique program meant to gain the respect and cooperation of hunters.

They are C. L. (Connie) Cox and Eldon Barnard. These two men have pooled their holdings (nearly two townships) and developed a rather simple system for controlling hunting on their land. They give each hunter who asks permission an admission card and a sticker for the top of their vehicle so it can be identified from the air. The card reads, "Hunter—please don't drive on grass, leave gates open, throw beer bottles or garbage on ground. If you see anyone doing these things please let me know."

Are these three unique and successful systems improving spotty L-S relations? We think so and would like to see all three expanded.

All three emphasize quality hunting and condemn "slob" hunting.

But all the best systems in the world won't work unless everyone cares about the future of sport hunting.

recycled paper

HOW TO HELP WILDLIFE AND STILL SELL A LOT OF BEANS

Everyone wants to save our diminishing species. But how many actually take a bold step forward to really "do something" about it.

Well, recently someone has, as this quote from a widely distributed advertisement points out.

"For every Big John's (Beans 'n Fixin's) or Snack Pack label you send us, we'll buy approximately 15 square feet of private land in a child's name next to the Chippewa National Forest in Minnesota. This land, where two pairs of nesting bald eagles have been found, will be turned over to the U.S. Forest Service and will be known as the first National Children's Eagle Nesting Area. A small start in saving the eagle, but a vital one. And as we acquire more nesting land, we'll create more safe nesting areas."

"The Bald eagle was chosen as our national symbol in 1782. Help keep him alive, so your child's generation can have a symbol. Of survival."

Yes, it would be nice if more companies associated their ad campaigns with an environment-improving action program of some type. This one sounds good, and we hope it's continued.

SORRY ABOUT THAT

An old friend called me the other day with a well deserved verbal jab.

"You know," she said, "you guys didn't even so much as mention the fact that Lones Wigger was a gold medal winner in marksmanship at the 1972 Olympics. And that he is the ONLY Montanan EVER to win TWO gold medals."

She's right, of course, so here we are better late than never.

Lones Wigger, Carter, won his second gold medal in Munich and his first in Tokyo in 1964. A "first" for Montana that deserves a special tribute. Winning a gold medal means he is the "best in the world" at that particular event. And Lones Wigger did it twice!

Lones Wigger

Congratulations, Lones.

WHAT IS AN ANTI-HUNTER?

MONTANA OUTDOORS has spoken out many times on the growing anti-hunting sentiment spurred by an undetermined number of individuals who publicly

—An Environmental Protection Agency news release tells us the easterners have actually found a use for abandoned, unreclaimed strip mines. They are filled with garbage and other solid waste and then covered with the soil originally extracted from the mine. Let's hope we won't be able to do this in Montana.

—Only 12 per cent of the eastern Montana coal reserves are strippable. The other 88 per cent must be deep mined or left forever.

—A lot of Montanans are pretty perturbed with Montana Power. I guess that's not really news, except this time it's for a different reason. Nobody seems to like paying extra utility charges to develop eastern Montana coal fields and build giant electric generating plants . . . especially when so much environmental damage is involved and when most of the coal, power and profits go out-of-state.

—The U.S. Senate passed a hurried resolution calling for a moratorium on all federal coal leasing. Sounds great, huh? Intentions were honorable, I'm sure, but enough leases already exist to strip mine Montana for many years. We've even heard estimates up to 50 years.

—There's an undocumented, but interesting, rumor floating around that the controversial North Central Power Study is now a "dead issue." It was so far out of line in predicting the development of eastern Montana coal that even some of its major contributors won't support it.

—Why do you suppose power companies spend more money advertising lawnlights, electrical appliances, electric heating and other power uses than on environmental research if the energy crisis is as serious as they say?

recycled paper

THE CATCHALL

advocated an end to all sport hunting.

But who is this person, the anti-hunter, the well-wisher-of-wildlife who would cut the throat of conservation and wise resource management?

Dr. Joseph Plummer, research manager for the Leo Burnett Company, Chicago, made a detailed analysis and concluded that the "typical" anti-hunter is:

1) distinctly to the right of center on the political spectrum.
2) normally a well-educated liberal.
3) a person for whom anti-hunting is only one among many social issues—and probably near the bottom in concern.
4) caught up in the general revulsion against violence and thus against hunting.
5) and maybe one for whom anti-hunting is a sole occupation.

All in all, the characteristics are still vague, but they may help you sort out the anti-hunter.

A FUNNY THING HAPPENED ON THE WAY TO AN EARLY ELK SEASON

On the first day of the last early bull season, an irate fellow stopped in at one of our checking stations with a few words of wisdom for the unsuspecting game manager on duty there.

"I hate this early bull season," he began. "It screws up the breeding habits of the whole elk population. We ain't gonna have any elk if you guys don't stop this soon. At least you stopped letting everyone shoot spike bulls. They do most of the breeding."

"And," he said as he stomped back to his car, "it's always so warm this time of the year that all the meat spoils anyway."

Three days later (at the end of the early bull season) the same individual checked in at the same station and said, "Well, I'm sure glad I didn't get one in this early season. I'll get a cow or a calf later. I like them better anyway."

GETTING RICH ON POLLUTION

The Hudson River Fishermen's Association was awarded $20,000 for giving information leading to the prosecution of Anaconda Wire & Cable Co. Following its indictment, the company pleaded guilty to discharging copper into the river and was fined $200,000. The reward was the largest of the three such awards received by conservation groups to date.

Maybe this deserves some looking into.

YES, THEY STILL HAVE A FEW WOLVES

The U.S. Forest Service tells us they're quite positive at least three wolves reside in the newly designated Lincoln-Scapegoat Wilderness. The wolf, like the grizzly, requires wild land to exist, so perhaps the protection of this back country area has helped save another dwindling species.

NEW COMMISSIONER

Joseph J. Klabunde has been reappointed to the Montana Fish and Game Commission for a two-year term by Governor Forrest Anderson.

Klabunde, a commission member from April 1967 until his resignation in 1971, was appointed vice chairman of the commission in 1968. He will serve on the commission until April 1975. All governor appointments are subject to approval by the State Senate.

The Minnesota native resides in Havre and operates a mobile home dealership. He and his wife have three children.

Klabunde, an avid sportsman and a proponent of better landowner/sportsman relations, replaces Robert J. Emmons who resigned from the commission in September and has gone abroad to study law.

editorial

COAL CONTROL

How many Montanans have said something to this effect in the past year? "We have to control this coal development or else." We know it has been repeated over and over because we've heard it and caught ourselves saying it several times.

But how? How can it be controlled? Or better yet, can we hope to control it at all?

Well, we think it can although it certainly won't be easy. Here are our suggestions:

—First, and probably most important at this point, is the success of a new law that guarantees successful reclamation and the right to prohibit mining.

—Also absolutely necessary is full cooperation from industry. This includes the disclosure of future plans while alternatives still exist, not after plans have been finalized, equipment ordered and a definite construction time-table established.

—The theory or "hope" that the federal government will "bail us out" must be abandoned. The federal government had done little to control the development. In fact, some conservation groups think the Department of Interior and other federal agencies are actually "promoting" it. The Interior Department's role in the North Central Power Study substantiates our opinion on that matter. An overpowering state role is desperately needed.

—A pure conscience by industry would also help, but it's a remote possibility. Evidence today suggests the industry still clings to a "do no more than we're forced to do" attitude.

—The establishment of a national energy policy could solve it all, but again, prospects are dim. This nation must recognize and strive to meet our real energy needs rather than the demands of utilities and others dependent on power development for existence and profit.

—And, to repeat, an equal amount of research is needed to find an alternate energy source for fossil fuels and more efficient utilization of traditional fuels. We wonder why it is necessary to burn all our natural fossil fuels before switching to another source of energy.

—That priceless commodity, water, could provide the handle conservationists need to control the development. Yellowstone Basin water will be used in the steam generating plants planned for eastern Montana . . . unless it just isn't available to the industry. Control the water, and we may control the development.

—And lastly, assuming the development proceeds full-steam-ahead, it must pay its way. Strict taxes on coal should be an expanded source of income for all levels of government. Several have already been suggested, two of which seem especially worthwhile. They are: (1) a tax on extracted coal as opposed to a net proceeds tax and (2) a sulfur emission tax. By taxing the coal, the costs of protecting Montana's environment are passed on to power consumers, most of which will live out-of-state. Or, in other words, assuring better reclamation and environmental protection at no expense to the Montana taxpayer.

Well, those are our ideas on "coal control." Let's wait and see what happens during this legislative session and during the next few years. Hopefully, at least some of these will be more than "just talked about." *—Bill Schneider*

THE COVER STORY

MONTANA COAL--part one

by Bill Schneider

THE BIG SACRIFICE

EDITOR'S NOTE—The Department of Fish and Game views the upcoming extraction of billions of tons of "black gold" and the subsequent industrial development slated for eastern Montana as our most serious current environmental issue.

Anyone who has visited these rolling prairies, pine-covered hills and sagebrush flats couldn't bring himself to "write them off" as Montana's contribution to an unwarranted demand for electricity. The charm of the western plain quickly captivates even the casual observer. This area has irreplaceable environmental, cultural, scenic, social and historical values, all of which stand to be lost or altered beyond recognition.

Of initial concern to us, as an agency, is, of course, the nationally famous fish and wildlife resource found there. But even more important is the land, air and water on which this resource depends. This high quality aquatic and terrestrial habitat could disappear forever from Montana's landscape, leaving fish and wildlife as unfortunate victims and Montanans as the "biggest losers of all."

Evidently, the question of whether or not the coal will be wretched from the earth has already been answered. It will. Now, we, as Montanans, must decide how we should allow it to proceed and how it should be controlled.

To do our part, MONTANA OUTDOORS has planned a lengthy series of articles on virtually every aspect of the development. The following, the first, is general in nature and acts as a preview of more detailed stories to come.

Hopefully, our voice won't be lost in the uproar or drowned in the applause. Instead, we hope to make a meaningful contribution to determining the correct course the development should take.

IN PRIMEVAL TIMES, members of ancient cults sacrificed lambs, poultry and even humans to "please the Gods." Today, that practice is generally intolerable and quite illegal . . . or so it seems.

But now as this state braces itself for the sure-to-come development of its incredibly wealthy coal fields, some Montanans find it difficult to avoid the analogy.

That's right. Montana is now on the altar to "please the Gods" . . . the altar being the projected power needs or so-called "energy crisis" of this nation and the Gods, the coal companies, utilities, eastern and midwestern cities and water development interests.

For openers, Montana stands to lose 770,000 acres of productive prairie and excellent wildlife range, 2.6 million acre-feet of Yellowstone River water, air quality ranking close to the cleanest in the nation and another contest with "boon and bust" resource exploiters.

After all the coal is stripped (about 35 years) and burned for thermo-electric energy, Montana gets a lower quality environment, a stagnant economy, reduced fish and wildlife populations, a declining tax base and an even higher unemployment level.

So, let's call it the *BIG* sacrifice.

what exactly is happening?

This feature is by no means a great exposé of proposed industrial growth spawned by rich eastern Montana coal reserves. Much has already been said and written, some bad and some good, but mostly bad.

Lying beneath eastern Montana and parts of neighboring states is probably the richest mineral deposit in the world—34 billion tons of strippable black gold—sub-bituminous coal and lignite. To

F&G photo by Harley Yeager

SACRIFICE

this——for——this?

(c) NATIONAL GEOGRAPHIC SOCIETY

Will Montana prairies (left) duplicate the sickening ugliness of many ravaged eastern areas? (right) Not if Montanans came to arms to carefully control every facet of the upcoming coal development.

further its attractiveness are the generally shallow overburdens (sometimes only a few feet), thick seams (more than 50 feet) and low sulfur content (averaging less than one per cent). Most of the coal will be strip mined which, compared to subterranean mining, is safer and less expensive. It is, however, much more damaging to the environment.

Although eastern and midwestern coal fields still provide 94 per cent of the nation's 600 million-tons-a-year demand, these states only contain 17 per cent of the remaining strippable, low-sulfur coal. It's this alarming statistic, 83 per cent of the nation's strippable coal reserves in western states, that is bringing the coal industry west.

Anyone sitting back and hoping "it might not happen" had better wake up and start wondering "how it can be controlled." For the extraction of

THE IMPENDING DEVELOPMENT OF COAL RESERVES IN MONTANA AND OTHER WESTERN STATES MAY VERY WELL REVERSE THE POPULATION TREND OF THE CENTURY AND SEND PEOPLE SCURRYING BACK TO THE "OLD EAST."

THE BIG SACRIFICE continued

Montana's strippable coal is a positive thing and already underway.

Never before has the Big Sky State faced a situation with the possible environmental and socio-economic ramifications of this impending development. The wonders of modern technology have provided the strip miner with tools to assault the land with a destructiveness previously believed impossible. And this same miner, the stripper, has staked his claim in eastern Montana.

In fact, coal companies, utilities and water developers view it as the "hottest thing going" and take the extraction and subsequent industrial complex for granted.

"We're sitting on one of the largest, if not the largest, coal deposits in the world," said Gene Tuma of Peabody Coal Co. at a Land and Water Use Seminar in Billings in May, 1972. "We're committed to this development because of the need for energy."

(Incidentally, Peabody is one of the four present strippers of Montana coal, holds one-third of the coal leases in Montana and North Dakota and has a questionable environmental record.

But as developers applaud the "discovery" which was actually discovered decades ago, landowners, angered by the possible loss of their livelihood—the land, condemn it.

"If we don't stop this powerful coalition of industries," warns Rosebud Creek rancher Don Golden, "they will gobble up the whole southeastern corner of Montana before the public even realizes what's happening."

Most landowners in that region and most developers involved share the strong feelings of Tuma and Golden.

is it really real?

Yes, it's "real" on two counts. First, the urban centers of the Midwest and East are, for the first time, feeling the "pinch" of air pollution controls. Industrialists are shifting their economic eye from more accessible coal fields to low-sulfur western deposits. (Montana's coal averages one per cent or less sulfur whereas that of Kentucky, Appalachia and Pennsylvania runs four per cent or more.) By using Montana coal instead of that of closer reserves, industry can escape clean air restrictions by pouring less sulfur oxides into the surrounding air and can avoid painful economic changes in their plant's machinery.

(Some observers, however, believe it would be much better to clean up once and for all instead of "weaseling around it" with different fuel.)

The truism that urban America views Montana coal as an escape route past needed air pollution control devices brings to the surface one of the rarest bits of irony ever unearthed. The quest for a cleaner environment in larger cities in the form of pure air will, unless immediate action is taken, degrade the environment in the form of uprooted land, dry rivers and filthy air in eastern Montana.

Or, in short, an environmental action program (clean air in big cities) will indirectly destroy the sparsely populated and supposedly "desolate wasteland" on eastern Montana.

The very idea of shipping Montana coal to be burned in Chicago, Minneapolis or St. Louis was unthinkable a few years ago. But now, with the ghosts of air standards haunting polluters, the ancient economic laws are collapsing.

Not all of Montana's black gold will be loaded onto trains for long rides to urban centers. Some will fuel electric generating plants in and around Montana with the resulting power transferred out of the state via a proposed giant transmission grid requiring about 4,600 square miles of right-of-way. And some fire coal gasification and liquefaction plants.

Building the power plants here instead of where the energy is needed prevents further damage to already devastated environments. Eastern Montana (where the land, water and air is still pure) has the capacity to absorb dirty air and wrecked land. Perhaps the logic behind it all is to "spread out" the pollution rather than concentrate it all in a few urban areas.

Secondly, the need for energy will supposedly increase as pointed out by Tuma of Peabody, the now infamous North Central Power Study (NCPS)—prepared by the Bureau of Reclamation and 35 major utilities—and all others dependent on power development for subsistence. That means the black gold will fire monstrous power plants in Montana and other western states. The plants (the NCPS forecasts 21 for Montana) will sprout from the rolling prairies destroying the serenity and balance of rural culture. Many Montanans are already wondering how the complex can fit into their way of life. Some think it can not.

But the Bureau of Reclamation, which will play a big role in the development, does. The federal agency notes, "Construction of water supply facilities and associated development of the coal resources would change portions of the southeastern Montana-northeastern Wyoming area from a quiet ranching economy into a bustling energy-producing or industrial-based economy."

Regardless of how "outside interests" and federal agencies view the development, it's safely said that Montanans hold that particular part of their heritage in high esteem and will be quite reluctant to consider it their donation to technology.

is there really an energy crisis?

Must the demand for power "double every 10

years," as predicted by the NCPS?

Don L. Brown, director of the Montana Department of Fish and Game, thinks not. He points out that NCPS fails to discuss "present frivolous and wasteful uses of electrical power."

And John Goers, reclamation administrator for the Montana Department of State Lands, also wonders. In the same panel discussion where Tuma took the energy need for granted, Goers asked, "Why are energy companies still urging the public to get an electric toothbrush and the 'when-I'm-not-there' yardlight and then complaining about the energy crisis?"

That's like advising someone to eat all their food today so they can go hungry tomorrow.

The entire question of whether or not there actually is an energy crisis will be brought up many times before development goes further. Predictably, those now dependent on energy development will insist the crisis is approaching disaster proportions, and environmentalists of various extremes will contend it's only a hoax conceived and blown up by power companies to assure their future existence.

What nearly all concerned—pro and con—will agree to is that it may not be a power shortage but a simple fact of power in the wrong place at the wrong time and the lack of inter-connection in the power grid. Supposing that's true, the 53,000 megawatts of electric power predicted to come from the Montana-Wyoming complex may not be needed right now. And that means there may be an excellent reason for tightening the reins on coal development until such time as the power is positively needed.

(A megawatt equals 1,000 kilowatts, so 53,000 megawatts is enough electricity to light up 530 million 100-watt light bulbs.)

That action would certainly be strongly supported by the Montana ranchers who fear they have little to look forward to but gaping holes and spoil banks where their livestock now roams.

And again, if the extraction of coal were slowed, which is very unlikely, other non-polluting and undestructive energy sources like steam, wind or solar energy may be perfected . . . and eastern Montana prairies could remain themselves forever.

The Sierra Club, for one, has decided to do more than cuss the energy crisis, something they view as a complete fallacy. They've advocated a ban on all coal-burning, electric-generating plant construction until more attention is given to other power sources.

Such a moratorium becoming a reality is about as likely as a bolt of lightning striking the reader as he reads this. But nevertheless, the point is made—the actual "need" for energy, other than financial profit for coal and power companies, must be carefully investigated before the green light flashes and not "after the fact" as is the case with many resource-degrading developments.

how far has it gone?

Montana strippers are already wresting 16 million tons (disturbing 275-500 acres) of black gold from the prairie each year. Most of it is then loaded on trains bound for points east—St. Louis, Chicago, Omaha, Minneapolis. That's up 16-fold from 1968, and by 1975 the state's annual output is expected to reach at least 20 million tons. Maximum consumption of 200 million tons annually (involving about 5,000 acres) is projected for sometime after 1980.

What does Montana get from all this? Very little, according to Director Brown. He believes the "most shortsighted action we could allow would be to burn our coal in inefficient generating plants to be consumed as electricity in the midwestern United States." And most others likewise concerned about Montana's natural resources and social welfare agree.

"THE ONLY REAL ARGUMENT I HAVE HEARD AGAINST STRIP MINING IS THE CLAIM THAT IT RUINS THE LANDS." —Congressman James Kee (D-W. VA.)

The NCPS notes coal reserves will only last 35 years if developed to the report's suggested level, and the coal will be burned in inefficient power-generating plants with 60 to 70 per cent written off as waste. (Montana Power admits the J. E. Corette plant at Billings is only 27 per cent efficient.)

is there any alternative?

Considering the traditional American fashion and the economics of it all, it's doubtful any alternative to strip mining/power plant generation will be seriously considered. However, at least two exist.

Bruce Driver of the Environmental Policy Center (a Washington, D.C.-based coalition of conservation groups) says deep mining represents "the only realistic substitute for surface-mined coal. Even in today's economic and technological frame-

THE BIG SACRIFICE continued

work, there are abundant deep mine reserves of very low sulfur coal to offset a loss of surface mined coal."

He cites Bureau of Mines statistics in saying, "There are 221.5 billion tons of low sulphur deep-minable coal which can be mined and mined at today's prices, under today's technology. This figure is about 1,118 times the total amount of surface-mined coal burned by electric utilities in 1970."

According to the same figures, Montana has 47,726 million tons of low-sulfur deep-minable coal and 6,133 million tons of strippable low-sulfur coal. That translates into an interesting fact—only 12 per cent of Montana's low-sulfur reserves are strippable and the rest must be deep mined or left.

Perhaps the only other choice represents a crash program to develop alternate energy sources. Several possibilities exist (i.e. wind, solar, steam, tides, fuel cells) but the "Gods" seem to have their sights on strip mining, and research on other energy sources is stored in the back room.

where do we stand now?

At this writing, four strippers are at work in eastern Montana—Decker Coal Co. (near Decker), Knife River Coal Co. (near Savage) and Peabody Coal Co. and Western Energy, a Montana Power subsidiary, (both near Colstrip). At least two more are presently preparing to open mines—Morrison-Knudson, a partner in Westmoreland Resources, a conglomerate of coal and energy companies, (north of Hardin) and Consolidation Coal Co. (in the Bull Mountains, near Roundup).

All four active mines have "voluntary" reclamation contracts issued under the 1967 Reclamation Act. Miners in operation before the effective date of the 1971 law (March 9, 1971) aren't bound by its stricter provisions.

Reclamation specialist Goers thinks "these contracts do not meet Montana's needs and require very little in the terms of quality reclamation. They contain very few grading or revegetation requirements and only one (of the voluntary contracts) is covered by a bond to assure promises are kept."

He notes some of the "reclaimed lands under the 1967 law do not even support thistles let alone grass or wildlife browse species."

Knife River and Decker coal companies have voluntarily applied for the stiffer contracts required by the 1971 law, according to Goers. "These appli-

What's happening in Sarpy Creek?

"Who goes there?" say the ranchers of the Sarpy Creek drainage, north of Hardin, Mt.

"Just us railroads and strip miners," comes a gruff answer.

"Oh," say the ranchers, "does that mean we have nothing to worry about?"

No answer.

But some of those farming and ranching the sandy soils of Sarpy Creek are worried about losing their livelihood—the land . . . about their children (front cover) . . . about the wildlife their land supports so well . . . and just plain worried.

One is John Redding, who ranches just north of a budding strip mine and a mile or so from a planned railroad spur to the mine.

"When I see them making their road, leveling out for their mine and just making a big mess up there, I just feel pretty sick," Redding told MONTANA OUTDOORS.

"Why I wouldn't be surprised at anything. Things have happened out here, you wouldn't believe."

Redding and other Sarpy Creek residents spin wild tales of pressure tactics employed by coal companies to obtain their land without paying a fair (in the rancher's mind) price for it.

Under slow-moving Sarpy Creek lies rich seams of low-sulfur coal which is sought by giant coal companies such as Westmoreland Resources, Inc. and Consolidation Coal Company. The Crow Tribe at one time owned the surface and the mineral rights to the Sarpy Creek area. But then, probably because they needed the money, they sold it back to the federal government. And then, when they found out about the incredibly rich coal reserves they had sold, they cried "foul" and were returned the mineral rights. The federal government, however, retained the surface and dished it out under the homestead acts to "develop the West."

Now, the West has enough people, but the statutes still stand. The unusual situation being—the Indians own the coal even though it's not part of the reservation, and the surface is in private ownership, mostly in small ranches.

Westmoreland, et al., have leased the coal from the Crow Tribe. According to the New York Times, Westmoreland Resources, Inc. (a recently formed partnership between Westmoreland Coal Company, Morrison-Knudson Company, Kewanee Oil Company and Kemmerer Coal Company) received the coal rights to 32,000 acres of Indian coal for an average cost of only $7.87 per acre.

Actually, the coal companies wouldn't need the surface as they have the legal right to go in, explore for and mine the coal. But they decided to obtain the surface also.

Redding and a few others balked and objected to the offers of Westmoreland, creating a standoff.

"Being the surface is owned by private citizens," Pemberton Hutchinson, president of Westmoreland, told MO, "you either have to get them (the ranchers) to sell it to you under their own free will or exercise the right of the law utilizing condemnation proceedings."

Normally, Westmoreland, et al., go in, pay the landowner damages and mine the land. "But suppose," Hutchinson notes, "the landowner won't agree to damages or simply won't agree, period. Then the miner only has two alternatives: (1) to not disturb the land—walk away from it or (2) to proceed against the landowner under condemnation."

Hutchinson said they aren't filing any condemnation suits. "We've gotten enough people to agree that, at least for the time being, we don't have to go that route. We needed to settle with eight landowners and we settled with six . . . and that's enough."

(Westmoreland will open its strip mine on April 1, 1974, according to Hutchinson. Right now, topsoil is being stockpiled for later reclamation efforts, a 75-cubic yard dragline is under construction and several other preparatory projects are underway.)

Even though Westmoreland insists they have no plans to bring condemnation suits against the Sarpy Creek ranchers, Redding insists they threatened him with legal action. And he has a letter (dated Feb. 25, 1972) from a Billings law firm representing Westmoreland that states,

cations did make some commitments such as the salvage and re-use of all topsoil on the mine sites. The Peabody Coal Co. has similarly applied, making commitments to re-topsoil at least half of the coming year's disturbances. Peabody had just put a brand new self-elevating scraper to work saving topsoil when members of the reclamation division visited the mine site in mid-November."

But on the other hand, those who feel confident that Montana has the time and resources to control the development are somewhat disillusioned. At least, that's the opinion of Ted Schwinden, State Land Commissioner.

At a Conservation Foundation hearing at which he was invited to testify, Schwinden blasted the "emphasis on rhetoric rather than action" that left Montanans frustrated. "Our governor, state agencies and citizens have been told that development is a long way off, that there is plenty of time and that the coal will be there for a long time," he continued. "This is directly contradictory to what is occurring in our state."

Schwinden noted that Montana was already scrambling to do everything it could to prepare for the development, but that federal assistance would be welcome and probably necessary. "We (Montanans) have decided the time has come to stop giving away our natural resources and . . . insist on a *fair return.*"

As a "fair return," he suggested more jobs, adequate planning to prevent haphazard growth, reclamation to "equal or better use," guarantees there will be "enough water for Montana's largest source of wealth—agriculture," adherence to air and water quality standards and a significant state role in determining the direction of the development.

"And," he concluded, "we do not want the beauty of our prairies, the productivity of our farms, the culture of our small towns and the heritage of our state sacrificed to unreasoned industrialization."

Schwinden also predicted that without adequate controls, the development would leave Montana with "a high unemployment rate, a declining tax base, a stagnant economy, a degraded environment and bitter memories."

In anticipation, Montana has already passed a reclamation law, strengthened water and air pollution regulations, set up an Environmental Quality Council to monitor state agency activities affect-

"Absent such positive steps or acceptance, Westmoreland will have no alternative but to institute an action against you to condemn the surface necessary for its mining operations. Westmorelaud is reluctant to follow this course."

To obtain the surface, Westmoreland employed a Billings firm, Norsworthy & Reger, Inc. Redding and a few others condemned the tactics used by the firm to get the surface.

"They told me to be moved off by the first of March (1972) or else," Redding recalls. "I told them I had 60 acres of wheat to get out, but they said that was just my tough luck."

"I guess one way you'd say it is a guy is putting a rope around your neck and tying that rope to a limb and he's about ready to kick the stool out from under you. You don't know whether he will let you drop or whether he's bluffing. You have to make a decision kind of quick. What is he gonna do to me? Am I gonna survive or is he just bluffing?"

Redding tells of a financial offer that was so complicated that he really didn't know what he was getting or what he was selling or how much he was getting for it. "Why, when everything was done, we got about $10 an acre, and they got a mortgage on your whole place, and you end up paying interest to them."

"I had a neighbor who signed that thing," Redding says, referring to the lease agreement offered by Westmoreland. "I was over to his house the other night and he was crying. He's a bachelor, so his place is about all he's got, and he was sitting there crying. I tell you, you see a neighbor that would do anything for you, and you see what's happening to him and you're helpless. I decided right there that I was gonna get organized before I would have anymore dealings with them [the coal companies]."

Hutchinson of Westmoreland, however, feels the criticism isn't "fair."

"Norsworthy & Reger were hired by us to acquire surface," Hutchinson said. "There's a difference of opinion on how they acted. I'm sure they told the landowners that there was the right of condemnation. And I don't think the landowners particularly liked what they heard . . . In fact, they were annoyed as hell."

"We [Westmoreland] weren't there. We hired Norsworthy & Reger because we thought they were the best to do the job."

As for the complexity of the financial offer, Hutchinson also disagrees. He describes it as a simple act of buying the land and then leasing it back to the rancher "before, during and after mining and after mining at a very nominal fee about equal to the taxes."

"They don't have to move off, they stay right on the land."

But Redding didn't sell, doesn't like the idea of looking out his window each morning and seeing a strip mine, insists he was told he would have to move from his land after mining began and has his own ideas on what his land is worth.

"I have a millon dollars-a-section figure in my mind and it sounds awfully good to me. I think it's worth that, but I'm still not crazy about letting it go."

To get Sarpy Creek coal out, Burlington Northern (BN) is constructing a 35-mile railroad spur south from Hysham along Sarpy Creek to the mine site. The spur line has probably caused as much ruckus and ill feelings as the strip mining itself.

Some of the local residents saw it as an opportunity to stop the destruction of their land by miners and the railroad. They tried to keep BN from obtaining the necessary right-of-way. But as it often goes with such attempts, it didn't work. BN will have its right-of-way in the near future. The railroad has almost all necessary easements except a few that are in the negotiation stage. They did, however, have to file several condemnation proceedings to get their right-of-way. The line is already under construction.

"You can't stop the railroad," says Harold Miller, who farms near Hysham at the beginning of the spur line. "You just got to get the best deal you can. They say they will make more open water for the ducks in those marshes out there. I figured that was pretty good, considering"

All is not settled, however. There is still a legal question as to whether BN has complied with the letter of the law, namely the federal and state environmental policy acts and Interstate Commerce Commission regulations.

What lies ahead for Sarpy Creek? Strip mines, more people, more railroads, less productive land, less water, fiery tempers and bitter memories to be sure.

"They aren't helping us any," challenges John Redding. "They're helping themselves and some of the people who got stock in their companies. That's who they're looking out for."

"We just can't take on Continental Oil or Westmoreland by ourselves. We're only a few small ranchers. We need help. We need backing all over the United States."

So it goes in Sarpy Creek.

THE BIG SACRIFICE continued

ing the environment, hired more people to study various phases of the development, made it a political issue and formed a six-agency task force.

And to further the state's grip on industrial growth and mining, the 43rd legislature will have before it a new and tougher reclamation law. Its major provisions (listed in an accompanying table) have already been heralded by most politicians and conservation groups. A few, however, claim it's still "too weak" and will allow environmental damage. But that view is shunned by the Department of State Lands which feels it's the best law we can hope for.

On the national level, some legislation involving strip mining will surely pass and probably this year. Its provisions include: (1) a ban on contour mining for coal on steep slopes where damage is greatest, (2) prohibition of any surface mining without a special permit from the Environmental Protection Agency (EPA), (3) a requirement that the permit guarantee the land be reclaimed to "original use," (4) a moratorium on federal issuance of coal leases and exploration permits on public lands, (5) special federal protection and aid to assure the restoration of any jobs displaced by surface mining controls and (6) provisions for full public participation.

The Wisconsin senator argues that the strip mining industry should not be allowed to pass the cost of reclamation on to the consumer but should internalize it. He also insists the stripper should bear the burden of proof that reclamation will be done.

"STRIP MINING IS LIKE TAKING SEVEN OR EIGHT STIFF DRINKS. YOU ARE RIDING HIGH AS LONG AS THE COAL LASTS, BUT THE HANGOVER COMES WHEN THE COAL IS GONE AND THE JOBS ARE GONE AND THE BITTER TRUTH OF THE MORNING AFTER LEAVES A BARREN LANDSCAPE AND A MOUTH FULL OF ASHES." —Congressman Ken Hechler (D-W. VA.)

Several bills are already hot conversation pieces in congressional halls. They vary from complete bans on surface mining to legislation written and sponsored by the mining industry to give itself a boost.

It's commonly known that to curb a public outcry like the one against strip mining, the target of the legislation (the stripper, in this case) actually writes and then supports legislation that "on the surface" seems to meet the demands of the populace. When it passes and the dragon's fire cools, exploiters go back to business as usual." Some

See page 26 for more on Montana coal

of this type of legislation has been introduced but hopefully, for the good of Montana, will not succeed.

However, other legislation that would virtually eliminate the stripper and all his ugly doings is also before Congress. Such is the case with bills sponsored by anti-strip mining Congressman Ken Hechler (D-W. Va.) and by a leading conservationist in the Senate, Gaylord Nelson (D-Wis.)

The intent of Hechler's bill is pure and simple —to end surface mining altogether and to reclaim all land now lying topsy-turvy after the stripper has uprooted the bowels of the earth.

Noting that strip mining is "environmental warfare on our own country," conservationist Nelson has written a similar but more detailed bill.

"Strip mining's permanent destruction of the values of the land has not only been a crime against the environment but an incredible economic waste," Nelson claims. "It levies a cost against the future far beyond any short-term profit that has been gained."

Another bill, sponsored by Senator Lee Metcalf (D-Mont), would implement a tough severance tax on the coal industry.

The U.S. House of Representatives did, according to Congressman John Melcher (D-Mont), pass "a strong national strip mining reclamation law." But Congress adjourned before the Senate could act on it, although it did approve a resolution asking for a temporary moratorium on federal coal leasing within Montana.

A ban on federal coal leasing doesn't really slow down the stripper, only muddles up his future plans a bit. Although estimates vary and depend on the extent of the mining, there are already enough federal coal leases to strip mine eastern Montana for 50 years at the present rate and less, if mining increases.

(In view of legislation sure to appear in Montana's legislature and in Congress, it's vital to realize the difference between a "moratorium on leasing" and a "moratorium on mining.")

But regardless of what legislation survives the congressional storm, Montanans can only hope it will aid their efforts and put a leash on the stripper

"THE MONTANA RECLAMATION ACT" (proposed)		"THE MONTANA OPEN CUT OR MINED LAND RECLAMATION ACT" (effective March 9, 1971)
Selective denial of the right to mine by the State where circumstances warrant.	—	State cannot deny right to mine.
Permit system, permit good for one year only, option to cancel at end of year.	—	Reclamation "contract" good until cancelled by mutual consent of the mines and the State.
Authority to regulate mining in rough terrain.	—	No control of mining on steep slopes.
Control of entire method of operation.	—	Control of reclamation plan only.
Maximum bond to insure reclamation is $5,000 per acre.	—	Maximum bond — $1,000 per acre.
Authority to immediately halt any operation in violation of the law.	—	Must resort to lengthy legal process to attempt to halt an operation.
Suitable vegetative cover must be established or bond forfeited.	—	Only two attempts at seedling required.
Statutory authority for contour grading and topsoiling.	—	Only best reclamation procedures available under the circumstances required.
Violator of law subject to $1,000/day fine, forfeiture of bond, and revocation of permit.	—	Violator of contract may be sued by state for breach of contract and payment of bond.
Authority to deny permit to repeated violators.	—	State cannot deny right to mine.
Restoration of land must be kept current.	—	Reclamation to be as current as feasible.
Citizens may act to see that law is enforced.	—	No related provision.
Citizens may recover for damages to ground water supply.	—	No related provision.
A surface owner may recover from a miner for damages from contaminated water draining from the mining operation.	—	No related provision.

that has started gnawing on the southeastern corner of their state. If a bill passes and no help comes or if no legislation succeeds, it will only add new weight to the theory that Washington, D.C. is only a fantasy-land where we send our tax dollars and problems without knowing what happens to either.

Federal action is an intangible to be hoped for and not depended upon. Of immediate concern to Montanans is the proposed reclamation law now before the state legislature.

If the more muscle legislation succeeds, Montana will indeed have one of the best strip mine reclamation laws in the nation. That only seems appropriate since we have one of the richest strippable reserves. Passage will be a great victory, but then comes the problem of sufficient appropriations. Like so many laws presently on the books, it needs funds to implement it.

Undoubtedly, the new law will be hotly contested and one of the most controversial acts of this session, but also one of the most important for Montanans. Most opposition will, of course, come from those who would be affected financially by it.

Its passage means a big step in controlling the development . . . and the sacrifice will be called off, scoring one for the people and the land.

what do we have to lose?

The stripper is here—ripping up the prairie for his prize. The industrialist is coming—to produce the power and the pollution. And the profit and power are going—not to Montanans.

When development comes, something must go. So, in most cases, the electricity and coal will go—across state borders to urban America. But what else will Montanans yield to the strip miner, the power companies and air conditioners of Megalopolis?

Ask yourself that as you scan the next few pages. And then ask: Is this important to me? Important enough to retire a convenient, but unnecessary, electric appliance? Important enough to cherish it as part of my heritage? Important enough to join the battle to save it—even if I've never been there or never plan to go there?

Why not? After all, what do you have to lose?

The prairie, photo by Gus Wolfe.

Early morning on the plains, photo by Dale Graff.

The sand rocks of Sarpy Creek, F&G photo by Tom Warren.

Custer's Battlefield, photo by Norm Guyaz.

what do we have to lose?

continued

A weasel in winter, F&G photo by Ken Walcheck.

A hunter in anticipation, F&G photo by Keith Seaburg.

A plains mule deer herd, F&G photo

The sharptailed grouse, F&G photo

A fishery ju
F

made for family recreation,
photo by Steve Bayless.

what do we have to lose?

continued

Prairie gold, photo by Gus Wolfe.

Food for the nation, photo by Gus Wolfe.

The rural heritage—the land, F&G photo by Bill Schneider.

The prairie winter, photo by Gus Wolfe.

a rancher's view

by Wally McRae

WHAT DOES THE impending coal boom mean to agriculture in Montana? Can cows and coal coexist? What will be the effect on the air, land, water and the sociology of rural Montana? Will the broadening of the tax base ease the property tax burden of both rural and urban Montana?

These and other questions are currently being asked, and the answers evaluated, in my area of the state. Both the questions and answers have implications not only throughout the agricultural community, but on Main Street, in the courthouse and in the urban areas as well.

The vast majority of the coal is owned by either the federal government or out-of-state corporations. The farmer and rancher own most of the surface, much of the minerals (including gas and oil), but not the coal. Therefore, most of the royalty payments will leave the state just as the coal, or the products it produces, will leave the state while the state will be left to pay the social and environmental costs of development.

The first question that must be answered in the minds of everyone is, "Can the land be reclaimed?" Judging from the results of some of the coal operators, the answer appears to be, "No." But I personally feel with proper dedication by the coal extractors and proper supervision by the controlling agencies, in most cases, adequate reclamation can be achieved. The cost will be high, probably in the neighborhood of $1,000 per acre, but considering that the value of the extracted resource is from $50,000 to $500,000 per acre, the reclamation costs are certainly reasonable. The pervading myth that the coal activity is in a vast barren, tree-less, unproductive, desert-like region may have to be dispelled by presenting the area as it is—one of the most unique, productive and picturesque areas in the state. Since most of the major highways merely skirt the area, the desert myth is quite persistent. However, the energy companies have been successful in perpetuating the myth to justify not only their exploitation, but to falsely dramatize their reclamation problems and the futility of spending much money or effort to reclaim a desert.

Economically, the agriculturalist might be better off to sell the surface to the energy companies since most of us could sell our farms and ranches and, merely by putting the money in a savings account, vastly increase the return on our investment. Most of us are neither economically naive nor poor managers. We accept the low financial return for compensation in what I like to call a "psychic wage." We are willing to sacrifice income for independence and the gratification derived from our life style.

Although I am not an economist, I can see that industrialized societies and industrialized geographic areas are in worse financial condition than rural, agricultural areas. The reasons are very simple—as the population increases, the demand for governmental services also increases exponentially. When you couple the prospects of 770,000 mined acres with a projected doubling of the state's population in 25 years, I question not only if the mining and related industries can pay their own way, but whether Montana's existing industries have the financial ability to subsidize the economic problems created by the coal companies and related industries.

What sort of changes in the environment will take place by the mining of coal and its utilization? I recently attended a coal symposium where an air quality expert was asked to comment on a report that said the detrimental effect on agriculture, by coal utilization in Montana, would extend into the Dakota's and Nebraska. The expert replied that he felt this was an irrational exaggeration and that the deleterious effects would probably not cross the borders of Montana! There is something ironic about the agricultural industry, limited in its use of pesticides, growth additives and animal health products to almost the breaking point, but being endangered by another industry's relative freedom to degrade the environment. Perhaps even the success of mined land reclamation will be precluded by the burning and transformation of coal, making the environment too hostile to re-establish plant and animal production.

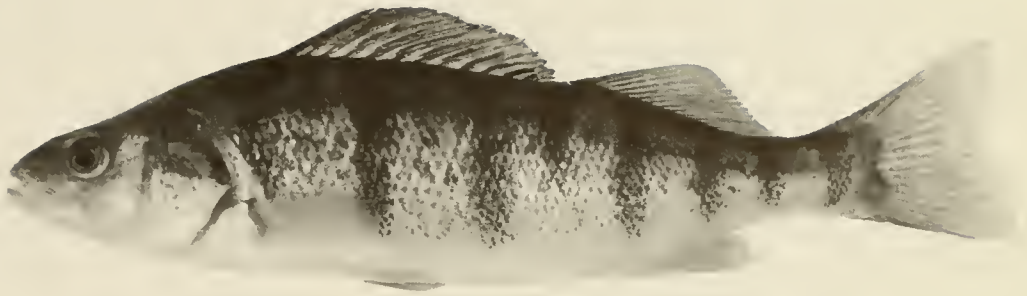
Wally McRae ranches near Colstrip, Mont., where both Western Energy and Peabody Coal Co. operate strip mines. He has been quite outspoken on the threat coal companies pose to Montana's rural heritage.

The aquaduct portion of the North Central Power Study projects water requirements to be up to 2.6 million acre-feet per year or 81 per cent of the mean annual flow of the Yellowstone River. From a water standpoint, this should not be acceptable to rural or urban Montana.

Finally, are we in Montana willing to pay the price of a change in our life style to accommodate a mass influx of new industry and new people into our state? Of all the problems and questions in my mind, this is the most unsettling. There is a Chamber of Commerce-type philosophy that permeates all rural states that says a low population density is somehow a liability and that people in these states must "do something" to attract new industry and people. If there are advantages to living in crowded, smog-bound, teeming cities such as Los Angeles, Chicago, New York and, yes, even Denver and Phoenix, I believe the disadvantages far outweigh the advantages.

We are also bombarded with cries of concern that our young, educated young people are leaving the state because there are no employment opportunities in the decadent state of Montana. I assume that the solution to this is to attract a Boeing or a Lockheed to Montana to employ our aeronautical engineers. We should encourage crime in order to keep our criminal lawyers and criminologists; we should create social disorder thereby providing in-state employment for our sociologists and economic chaos to retain our home-trained economists.

As a rancher, as an outdoorsman and as a Montanan, I believe we are making a mistake in encouraging coal development. It will not solve our economic problems in the long run, and even if it did, I believe the price would be too high environmentally, sociologically and aesthetically.



In defense of the PERCH

BY VERN CRAIG

Is this frisky little panfish just an aquatic weed?

NOW THAT I look at it, the title sounds presumptuous. Why should a creature that boasted a backbone millions of years before man's most distant kin need my defense? No other backboned creature can live its entire life submerged in water. "Poor fish" indeed.

But to some, "poor fish" would almost be a compliment. They might prefer "aquatic weed" or "poisoner of lakes."

The perch has always been a subject of debate receiving condemnations from hard-core trout anglers and applause from less skilled fishing families. But regardless of the angler or attitude, no one denies perch provide a widespread and easily available recreation opportunity to many Montanans.

Perca flavescens is its scientific name, but most of us know it as the yellow perch—a succulent little denizen of cool lakes and slow streams. Its nearest relative is the walleye, but the two are easily distinguished.

The perch family itself is readily identified by a very distinct fin pattern on the back (dorsal) fin which is really two large fins, the forward one armed with a number of very strong, sharp rays that support the fin and stick people's fingers. The gill covers (*opercula*) are also pointed, so it behooves one to handle perch gingerly.

Perch were introduced into the Missouri River impoundments at Great Falls and Helena about 1902, according to Dr. C. J. D. Brown's *Fishes of Montana*. Today they inhabit water in all major drainages of the state. They are essentially lake dwelling fish but do live in slow-moving streams with excessive vegetation.

In the hazardous world of fishes, perch live continually on the edge of oblivion. They begin their perilous existence as one of 10,000 to 40,000 small dots of life suspended in a ribbon-like mass. The strings of eggs are draped randomly over weeds, gravel, rubble, sandbars or submerged objects away from smothering silt. As the eggs are laid, one or two male perch hover alongside the female to fertilize the eggs. Spawning usually occurs at night when early spring water temperatures reach 45-50° F—during April and May in Montana. Eggs hatch in 10 or 20 days, and the fry begin their battle for survival. They characteristically swim in schools even as small fish. Their relatively small size, slow growth and swimming ability make them easy prey for larger perch and many other fish.

Young perch feed on tinier forms of animal life. As they grow, they take larger insects and other fish. They continue to travel in schools, often inhabiting deeper areas by day and the shallows towards evening. Evidence indicates males, females and different age groups travel in separate schools, so an angler's creel often contains fish all the same size.

In the northern waters, perch may live to 11 years, but southerly they are not so long-lived—probably 5 to 6 years. Brown says the largest perch reported from Montana was 13.9 inches and weighed

PERCH continued

1.8 pounds, but the usual length of adults is 4 to 7 inches (less than one-fourth pound).

It has been interesting to watch Montanans discover, or possibly re-discover, perch. Ten years ago, for example, the ice on Canyon Ferry Reservoir (on Missouri River, near Helena) and other waters was littered with discarded perch. During the last few years, however, few perch are thrown away and a growing number of winter fishermen concentrate on taking perch with trout as a bonus.

In defense of perch, the fish is known as a biter, not a fighter. When an angler has found a hungry school, the action will be fast and furious. And they can be easily caught by the most unskilled fishermen. Consequently, perching makes excellent family-type fishing and provides thrills for the youngsters. Perch will bite on almost any bait—maggots, small pieces of meat, worms or strips of perch.

Most perch are caught on or near the lake bottom. A conventional rig works best—a monofilament line weighted at the very bottom, one hook several inches from the weight and a second hook several feet above it. A bobber is often added and sometimes no pole, just a handline, is used. Monofilament line has been a great boon to winter fishermen. In combination with an open-faced reel, it can be used during cold weather without icing. If ice builds on the fishing rig, it's most apt to collect on the line guide at the tip of the pole. This can easily be removed after a short thawing with the fingers or breath.

In defense of perch, they rate near the top of the list for taste and texture. The simplest, and a perfectly acceptable, method of preparing perch is to pan fry. According to many cooks, pan fried fish should not be dipped in batter. A light dusting with flour or cornmeal after seasoning is sufficient preparation for the pan. For crispness remove the pan's lid so no steam will collect.

"Yes, I see the trout are biting like mad, but do you know if there's any perch around here?"

Since perch fillets are fairly small and cook through fully and uniformly, broiling or grilling will also do the trick. But because the fillets are small, the cuts must be kept far enough away from the heat source to prevent burning. Both oven and pan should be heated before the fish are cooked and the fillets should be well basted with butter or oil. To my taste, broiled perch retain too much of the "fishy" taste, but this is a matter of personal preference.

Deep fat frying is a process that shouldn't be discounted. Proper temperature, so it is said, is the secret to it. A thermometer dipped into the heating oil or lard will insure proper heat—recommended temperature is 360-380° F.

To deep fat fry, the fish should be dipped in batter. It need not be a complicated mixture. Dipping in milk and then flour or in beaten egg and then bread crumbs or cornmeal is perfectly adequate. (An added hint—don't forget to drain the fish on absorbent towel before serving.)

But one of my favorite perch dishes is commonly known as "poor man's lobster." The fillets are poached in seasoned water until well cooked and then dipped in hot butter. Both the flavor and texture are not unlike lobster tail. The water should be brought to a boil before the fish are added. The boil should be kept slow so the fillets don't fall apart. The polished gourmet may want to do his poaching in one of many exotic concoctions, including wine and vegetable liquors or lemon juice.

The catching is easy and the taste is delicious, so consider perching for your next family outing.

HOT SPOTS FOR PERCH

Northwestern Montana
Smith Lake, Blanchard Lake, Peterson Lake, Nine Pipe Reservoir, Ashley Lake, Lone Pine Reservoir, Middle and Lower Thompson lakes and Polson Bay on Flathead Lake.

West Central Montana
Salmon Lake, Seeley Lake, Lake Alva and Lake Inez

Southwestern Montana
Dailey Lake and Canyon Ferry Reservoir

North Central Montana
Arod Lake and Holter Lake

South Central Montana
Big Horn Reservoir

Northeastern Montana
Dredge cut trout ponds, Fort Peck Reservoir and Nelson Reservoir

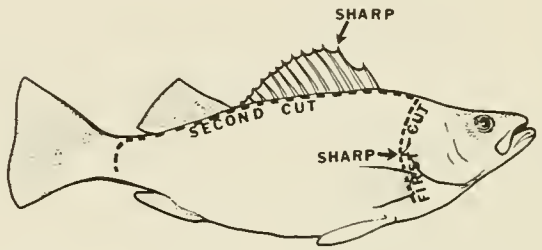
Southeastern Montana
Johnson Dam, north of Lindsey and Sportsmen Dam, south of Baker

HOW TO FILLET PERCH

Perch have many little bones, so the secret to full enjoyment is reducing them to boneless fillets. Many persons recommend a knife with a long flexible blade for filleting. Personally I like a knife with a rigid blade for most of the job, but a long, flexible blade is best for the final step, peeling the meat from the skin. Whatever the cutlery used, the blades should be relatively thin and sharp.

Newspapers are handy items for filleting. They keep fish from slipping around and keep the mess off tables and chopping boards. When a paper gets wet, just discard it and get a new one.

Don't be discouraged with the first few fish. They will be ragged. After six or so, you will begin to get the hang of it and will soon become proficient.



STEP 1: Slip a thumb under the fish's operculum (gill cover) and take a good hold. Be careful to avoid the sharp spine in the operculum.

Cut through the flesh to the backbone as shown in the illustration.

STEP 2: Starting at the back of the fish's head, cut along one side of the backbone to the tail. Now, deepen the cut so the flesh, with attached skin, is freed from the fish's rib cage as illustrated. Take care not to cut through the rib cage near the spine.

STEP 3: The fillet may now be easily peeled away from the skin with a thin, flexible knife. Turn the fish over and go through the same steps.

GAME HARVEST SURVEYS

HOW YOU CAN DO SOMETHING FOR BETTER HUNTING

by Burwell Gooch and Joe Egan

THE DEPARTMENT OF Fish and Game is not primarily a law enforcement agency but an agency responsible for administering Montana's animal resources to provide a satisfying recreational experience for Montanans, year after year, within constraints imposed by today's land use patterns. This department investigates the basic characteristics and requirements of animal populations (research) and then applies this knowledge in the field (management).

Hunting and fishing are major forms of recreation served by the department. These "harvest" activities are important tools in attempting to reach the goal of maximum recreation. To control these tools, we must (1) keep track of the number and kinds of harvesters (licenses) and (2) enforce game harvest and licensing regulations (law enforcement). In addition, we have other responsibilities, hence, the department has divisions, each with vital and distinct functions, but all related in one way or another to fish and/or game management.

This article focuses attention on the department's game division, whose primary concern is the management of Montana's game mammals and birds. In particular, we want to discuss the role played in the management process by the game harvest surveys conducted by this division each year.

Wildlife is a product of and dependent on the land, and management must have as one of its objectives the maintenance of wildlife populations in balance with the habitat. This involves maintaining both habitat and wildlife in a healthy, productive condition. But the production from a wildlife population cannot be stockpiled. Mortality occurs — hunting or no hunting. Certain populations can, however, increase to the point where they damage the habitat and sometimes agricultural crops. Thus, hunting seasons have two objectives—to permit recreational harvesting of the annual surplus of wildlife and to regulate the population so it is in balance with the existing habitat.

Burwell Gooch works with the Data Processing Bureau of the Department of Administration. Joe Egan is the assistant administrator of the department's Game Management Division.

It is virtually impossible to determine the total number of animals in a given population. But such population traits as average number of young produced per adult female, age structure and individuals' physical condition (all indicators of population health) are relatively easy to obtain. (Similar information is obtained about the habitat.) With such information, we can determine the condition and trend of both a specific wildlife population and its habitat.

Hunter harvest data for one or more years, in conjunction with population conditions and trends, indicates the kind (length, bag limit, special restrictions, etc.) of season needed to maintain healthy wildlife populations in balance with healthy habitat. Obviously, certain man-caused factors, which, if they damage, alter or destroy habitat, would be completely unaffected by hunting seasons (and probably unaffected by anything anyone could do).

The following hypothetical situation shows the importance of harvest data. If information indicates a deer herd is deteriorating (i.e. lower fawn crop, unthrifty animals, small antler size, etc.) and its habitat deteriorating from overuse by deer, we would refer to harvest data from the previous few hunting seasons. Perhaps the previous seasons called for a one-deer limit, allowed no $35 non-

resident permits, harvested about 400 or 500 deer and boasted a 75 per cent hunter success.

The data indicates too many deer for the existing conditions and a need to increase the harvest (i.e. two-deer seasons and possibly $35 nonresident permits). When the situation reverses, that is the habitat and deer population conditions begin to improve, seasons can be adjusted to enhance the deer herd and still harvest the available production.

why mail surveys

The best source of harvest information is the hunter himself. Numerous information-gathering methods have been tried, with most states settling on the mail questionnaire. Mail surveys are more reliable than any other economically feasible method. However, mail surveys do have their problems. For example, because of the "law enforcement" image characterizing the typical Fish and Game Department, game harvest mail surveys are less reliable than they might otherwise be.

Another problem plaguing all mail surveys and having a direct bearing on reliability is non-response. Some reasons for non-response are lack of interest, too busy, invasion of privacy, wrong address and not home. But when we add "suspicion of motives" to this list (and we must for fish and game surveys), the problem of non-response takes on major proportions.

Non-response results in loss of information, not so much in terms of quantity, but primarily in terms of quality. If quantity of information were the only consideration, the size of the survey sample could be increased to insure the expected response provided the desired reliability. Increased sample size cannot improve the quality of information.

For example, suppose all resident elk hunters are evenly divided (50:50)—Group A and B. Group A makes 80 per cent of the elk harvest in the state and Group B makes the remaining 20 per cent. Suppose further we sampled each group equally, but only Group B answers the questionnaire. If we weren't aware of the differences between the two groups, assumed the response was representative of all elk hunters and then estimated the statewide elk harvest on that basis, our estimate would represent only about 40 per cent of the actual harvest. This would be true regardless of sample size. Such an inaccurate estimate is worse than none at all.

mechanics of a mail survey

Mail surveys involve four basic operations: (1) preparation of a population register, (2) selection of a sample from this register, (3) preparation of the questionnaire for mailing and (4) processing the returned questionnaires.

A **population register** is simply a list of all license-holders. The register depends entirely on information supplied from a license sale. Any person who purchases a deer tag, elk tag, $20 Sportsman's License or $151 Nonresident License is eligible for the Deer and Elk Harvest Survey because each license permits deer and/or elk hunting. Likewise, any person who purchases a game bird stamp, $20 Sportsman's License, Pioneer-Conservation License, Pioneer License or a $151 Nonresident License qualifies for the Game Bird Harvest Survey. Furthermore, if someone purchases an elk tag *and* a bird stamp, he is eligible for both surveys and would appear on both population registers.

Preparing a population register is perhaps the most critical aspect of our surveys. The reason? The reliability of the resulting harvest estimates.

Of course, the objective of the register is to be 100 per cent complete and accurate. Unfortunately, it's quite impossible.

To understand why, it is necessary to know how license information gets from the license to the population register. A duplicate of every license, stamp and tag is kept by license agents and re-

Biologists checking browse plants to determine condition and use by game and ability of the area to maintain game. (F&G photo by Steve Bayless)

SURVEYS continued

turned, along with matching receipts, to the department's license division by the 10th of the month following the sale. There may be as much as one month between the time of sale of a license and its remittance by the issuing agent.

Following receipt by the department, license duplicates go through an accounting procedure that takes about two weeks, sometimes longer.

Now, the Data Processing Bureau, which by agreement with Fish and Game has responsibilities for the basic operation of the surveys, gets into the act. (The Data Processing Bureau of the Department of Administration is a branch of state government distinct and separate from the Department of Fish and Game.) Each week Data Processing codes license information onto magnetic tapes with special electronic machines.

After the license information is on magnetic tape, it can be used for population registers. Due to the several steps involved, it may take about seven weeks between the time a license is sold and the information is available for harvest surveys. Unfortunately, some license agents do not remit their receipts on time and during peak periods of license sales, there is delay in handling licenses. The result—about 10 per cent of the information is not available when the register must be prepared (usually in January). Thus we are forced to begin harvest surveys with incomplete registers of names.

Table 1
Sampling and Response Rates of Various Types of Licensees

License Type	Sampling Rate[1]/	Response Rate[2]/
Regular [3]/ Deer	41	52
Regular [3]/ Elk	41	55
Elk Permit	100	80
Nonres. $35 and $36 Deer	7-57[4]/	69
Moose	100	70
Bighorn Sheep	100	66
Mountain Goat	100	70
Antelope	3-100[4]/	66
Game Bird	20	54
Turkey	100	54

1/ Per cent of total population
2/ Per cent of questionnaires returned
3/ License-holders who may legally hunt anywhere in the state
4/ Sampled on a hunting district basis. The rate varies from one district to another depending on the number of licenses issued.

Incomplete registers are serious. But even worse, they are also inaccurate in the sense that some names, addresses and/or license numbers are coded incorrectly, sometimes by Data Processing but far more often by the license agents. In fact, the problem goes beyond mere inaccuracy to the point where many license duplicates are so illegible that they're useless. We must conclude that some license agents are not concerned with the importance of filling out licenses completely, accurately and legibly . . . and thus, not concerned with the essential role this information plays in the management of our game resources.

A computer compiles the register. Thus, if the license information is incomplete and inaccurate, so are the registers. The point is—once the original license data has been recorded on magnetic tape, human influence over the process has ceased. Neither this department nor Data Processing personnel have any idea which license-holders are included in a particular register. The computer tells us only the total number of license-holders in the register—no names, addresses or other data.

We would like to emphasize that new population registers are compiled each year, based on the current year's license sales. Previous years' license sales play no role, and the register is destroyed after each survey.

Sample selection depends heavily on statistical considerations. Some factors include: (1) desired precision of estimates, (2) type of license to be sampled, (3) expected response rate and (4) expected per cent of usable returns.

Once desired sampling rates are established, sample selection, like that of population register compilation, is entirely in the computer's "hands." It is a random process, with every license-holder having an equal chance to be selected. When the computer selects a license-holder, he is assigned a unique number identifying him as to license type and survey.

This number serves two purposes. It allows the computer to keep track of respondents to the original questionnaire so non-respondents may be sent a reminder. And in the subsequent analysis of some survey data, license-holders may require two or more data records. This number serves to tie these records together.

As with the population register, sample selection is a completely new operation each year. The inclusion of a hunter one year has no bearing on his chance of being selected again the following year. In fact, if he is a resident deer or elk license-holder, he has a 41 per cent chance of being selected for the Deer and Elk Harvest Survey in one year (Table 1), regardless of whether or not he was selected for a survey in a previous year. However, his chances of being selected two years or three years in a row (assuming he buys a license each year) are approximately 17 per cent and 7 per cent respectively. Whereas, his chances of *not* being selected two or three years in a row are about 35 per cent and 21 per cent respectively. Once a survey has been completed, the file of sample license-holder names is destroyed.

Preparation of questionnaires for mailing represents the third step of the mail survey. At the time a license-holder is selected for a survey, the computer prints his name, address and his assigned

TABLE 2
1971 MONTANA DEER AND ELK HARVEST ESTIMATES

DEER LICENSE TYPE	PERMITS	HUNTERS LOWER	HUNTERS POINT	HUNTERS UPPER	KILL LOWER	KILL POINT	KILL UPPER	PERCENT SUCCESS	AGE AND SEX ANTLERED	AGE AND SEX ANTLERLESS	AGE AND SEX UNK	SPECIES MULE	SPECIES WHITETAIL	SPECIES UNK	HUNTER DAYS
RESIDENTS															
DEER "A"		104223	104473	104723	66555	66949	67325	64	42794	22926	1220	47205	17414	2321	575740
DEER "B"		20118	20283	20448	14307	14495	14683	71	9315	4828	352	9355	4321	818	79951
TOTAL RESIDENT DEER		124457	124756	125055	81007	81435	81863	65	52109	27754	1572	56561	21735	3139	655691
NON-RESIDENTS															
BIG GAME-$151															
DEER "A"		8764	8850	8936	6440	6545	6650	74	4824	1602	119	5402	844	299	51403
DEER "B"		5314	5435	5556	4112	4229	4346	78	2995	1176	58	3556	511	162	23385
TOTAL NON-RESIDENT DEER		14137	14285	14433	10616	10774	10932	75	7819	2778	177	8958	1355	461	74790
ONE DEER—$36	13737	13198	13275	13352	12033	12156	12279	92	7563	4503	90	9232	2857	67	48217
TOTAL NON-RESIDENT	13737	27393	27560	27727	22730	22930	23130	83	15382	7281	267	18190	4212	528	123007
TOTAL DEER	13737	151973	152316	152659	103893	104365	104837	69	67491	35035	1839	74751	25947	3667	778698

ELK LICENSE TYPE	PERMITS	HUNTERS LOWER	HUNTERS POINT	HUNTERS UPPER	KILL LOWER	KILL POINT	KILL UPPER	PERCENT SUCCESS	AGE AND SEX BULL	SPIKE	COW	CALF	UNK	DAYS HUNTER
RESIDENTS														
NON-PERMIT ELK		54679	54900	55121	8302	8480	8658	15	3216	2023	2235	711	295	405335
ELK PERMITS	292	226	233	240	71	78	85	33	19	10	40	8	1	418
TOTAL RESIDENT ELK	292	54912	55133	55354	8380	8558	8736	16	3235	2033	2275	719	296	405753
NON-RESIDENTS														
NON-PERMIT ELK		8894	9077	9160	1914	1996	2078	22	821	495	519	109	52	64263
ELK PERMIT	8	8	8	8	4	5	6	63	2	3	0	0	0	13
TOTAL NON-RESIDENT ELK	8	9002	9085	9168	1919	2001	2083	22	823	498	519	109	52	64276
TOTAL ELK	300	63982	64218	64454	10363	10559	10755	10	4058	2531	2794	828	348	470029

number on the appropriate questionnaire. The address is attached to the questionnaire along a perforation so the recipient may remove the former if he prefers to remain anonymous. Although the number identifies the license-holder, only the computer can match name with number. As far as Fish and Game and Data Processing personnel are concerned, these numbers are completely meaningless.

Each step is by machine, but depends on human intervention for feeding the material into the machines, boxing the processed material and, most important, taking remedial action on mechanical failure.

And last, but not least, is **processing returned questionnaires**. As returns from the initial questionnaire mailing come in, information is coded on cards with machines. Names are not coded. Numbers are.

Three or four weeks following the initial mailing, reminders are prepared for non-respondents. After another three or four weeks, no more questionnaires are accepted. At this time, all the data from both returns are edited and analyzed.

Not all returned questionnaires can be used. Approximately 5 per cent are returned by the post office as "undeliverable," a problem traceable to inaccuracies in our population registers. (Discussed earlier.) Another 6 per cent are incompletely or incorrectly filled out or the questionnaire's code number obliterated or torn away. The latter attempt to remain anonymous seems especially unfortunate because it is entirely unnecessary and at the same time destroys otherwise useful information.

We realize there is concern about computer centers amassing vast banks of personal data on people identified by name and address. Understandably, people fear they are losing their privacy and, even worse, fear some of this information might be used against them at some future date. This is apparent, not only because some repondents obliterate the code number on their questionnaire before returning it, but also because they withhold information concerning location of kill of their game. This is their privilege, of course, but it really serves no useful purpose for them and, unfortunately, completely destroys the questionnaire's value to us. Thus, if a license-holder feels he must destroy his code number or withhold the location of his kill, he might just as well throw the questionnaire in the trash. In fact, we personally recommend the latter alternative because it saves postage and the additional costs of handling before the questionnaire is discovered as useless.

In an effort to allay these fears, we point out that this department is *not* in the business of compiling giant banks of harvest information on each license-holder in the state. And for a very good reason—this kind of information is of absolutely no value in managing an animal resource, which is

SURVEYS continued

what fish and game harvest surveys are all about. In other words, the game management division is concerned with *what* happened *where*, not *who* did what and where. Those who still feel our surveys are "witch hunts" should remember that the identity of all respondents is destroyed when a survey is completed. Only data on hunts and harvests is kept. In fact, the only questionnaires that are actually looked at by department personnel are those with written comments, requests or proposals. Everything else is handled by machines. Most people dislike being reduced to a number or known only in computer language, but in this case, it may be comforting to know only the computer knows the respondent.

the survey results

Mail surveys are designed to obtain accurate information within certain limits. Obviously, the only way to determine the exact number of animals harvested from a given area is to contact each and every person who hunted in that area for that species. That is impossible. We cannot set up enough checking stations to contact all hunters. Therefore, a statistical approach offers the only alternative in spite of its shortcomings. In other words, the program does not tell us exactly how many deer were killed, but it does tell us *about* how many.

If we look at Table 2, we see there is a point estimate at the 80 per cent confidence level of 104,473 resident "Tag A" deer hunters in Montana. Notice the columns marked lower and upper. Those columns mean that 80 times out of 100, we are correct in saying the actual number of hunters with an "A" deer tag lies between 104,223 and 104,723. The point estimate, 104,473, is just that—an estimate based on the statistical analysis of the questionnaire survey. A look at residents hunting with a "B" tag shows a point estimate of 20,283. (The same level of confidence applies to all types of licenses.)

Now, some of those 20,283 hunters with "B" deer tags are also the same hunters contained in the 104,473 "A" tags. The 124,756 figure (total residents, point estimate) means there were approximately that many total deer "A" and deer "B" licenses used in Montana in 1971. There may or may not have been 124,756 individual hunters involved. We say there were approximately 104,473 resident hunters with an "A" tag hunting in Montana and they killed approximately 66,940 deer. We say approximately 20,283 hunters with a "B" tag hunted in Montana and killed about 14,495 deer.

Within the accuracy limits mentioned, we can say that residents harvested approximately 81,435 deer in Montana in 1971. In the case of a nonresident with the $151 license, we see (Table 2) approximately 8,850 hunted with an "A" tag. We also note about 5,435 of the nonresidents hunted with a "B" tag. These nonresident $151 licenseholders harvested approximately 10,774 deer in Montana in 1971. And approximately 13,275 persons hunted with the $35 nonresident deer license.

The questionnaire, therefore, does give an indication of *hunting pressure* for the state. More important, it provides statistics on individual hunting districts which are the basic herd management units.

The "per cent success" column is based on the point estimates of hunters and kill. This figure indicates hunter performance when we evaluate hunting seasons. The "per cent success" figure, when viewed over a period of years, is even more indicative of what is happening in the state or in a given hunting district. Hunter success (per cent success) is not so much a function of the number of game present or the number of licenses sold, but rather a function of availability of the game (as influenced by weather, game distribution, etc.)

Age and sex estimates furnish information as to herd health, particularly when this information is supplemented by other data collected during routine field surveys. The "hunter days" column furnishes an index as to the amount of time a group of hunters ("A" tag, resident elk, etc.) spent pursuing a particular species, either statewide or by individual hunting districts. Information similar to that in Table 2 is also available for each deer, elk, antelope, mountain sheep, mountain goat and moose hunting district as well as for units established for other game species.

The success of game harvest surveys depends directly and indirectly on many people—agents who sell licenses, the keypunch staff who code the license data and the license-holders who receive questionnaires. In turn, these surveys play an important part in determining the success of the individual game management programs.

It is very important that each questionnaire be filled out accurately and completely. Responses from non-hunters, unsuccessful hunters and successful hunters are all *equally* important.

We believe anybody who feels it is worth the time and money to pursue the sport of hunting should also feel a commitment to the betterment of the sport. We also believe every sportsman who receives a game harvest survey questionnaire should recognize it as an opportunity to do something for better hunting with minimum inconvenience and no additional cost to himself. If, for some reason, certain persons choose not to act on that commitment, that is their privilege. But why penalize themselves and their colleagues who enjoy hunting so much? After all, the purpose of the management program is to benefit hunters and other recreationists, not the Department of Fish and Game.

A SOLUTION TO THE PREDATOR PROBLEM

I enjoyed reading "Calling All Predators" by Ken Walcheck in your July/August 1972 issue. I, too, like to spend my free time calling coyotes and foxes. I find it's a good way to keep my trigger finger from getting too itchy.

I have spent some time thinking about our growing predator problem, especially coyotes. Consequently, I have come up with the following proposal which might help to call attention to the problem as well as give sportsmen some off-season recreation. I suggest Montana sportsmen's clubs join together to hold a statewide, one-shot coyote calling tournament. It would be much the same as Wyoming's one-shot antelope hunt. This tournament could be held during the early fall when all the young coyotes would be weaned and on their own, thus increasing the chance of calling one in as well as making sure no young pups would starve because their mothers were killed.

Teams from all sportsmen's clubs in Montana and some from other states would be invited. Sites for such a tournament could be picked by the Montana Department of Fish and Game or Montana Stockgrowers Association. Prizes for winners would come from entry fees, sponsors and bounties (if any). It would, of course, be an annual event.

I realize that such events, in themselves, wouldn't do much to alleviate predator problems, but perhaps more sportsmen would become involved with predator calling and the sport itself would help reduce predator numbers. Who knows? With this common problem between them, maybe sportsmen and stockmen would get to understand each other better.

I would be pleased to meet with any interested groups in my area to explain my ideas further, and would like to hear from anyone with pros or cons concerning such an event.

Jay Conlon
Hardin Jr. High School
Hardin, MT

GRAB YOUR HAT AND RUN

I find it difficult to refrain from commenting about the letter reproduced on page 3 of the Sept/Oct 1972 edition of MONTANA OUTDOORS. The inevitable display of an enticingly luscious feminine sex symbol is used to attract attention and to make its points. The letter is signed by nine female entertainers noted for their physical attractiveness, but as a handwriting analyst, their attractiveness ends with their external appearance.

There isn't a single, well-adjusted personality in the entire group. Not one would be worthy of a second glance by a discerning male interested in something more durable than a sexy face and figure. While there is an abundance of talent and originality, there is also a superabundance of self-interest and egotism to a sickening degree.

The script of Gretchen Wyler is particularly interesting. The pen strokes resemble a tangled jungle reminiscent of the professional diplomat. The script is practically unintelligible, indicating a covert, secretive individual who obscures real intentions behind a screen of outward agreeableness while being actually noncommital, and keeping one's real intentions and purposes to oneself.

One can never get really close to such a person. Nice to look at but difficult to live around.

Deer? Dear? Hogwash!

The best way to combat such an individual is with one's hat. Grab it and run!

Sincerely yours for the exposure of all phonies.

DeMart C. Besley
Certified Graphoanalyst
Darby, MT

DISAPPOINTED

What a disappointment. Just when I thought I had found a publication with common sense attitudes towards hunting, game management and conservation, you had to tarnish that image with the article by Dorothy Bradley (The Power of a Woman, Sept/Oct 1972). From her advocacy of consumer boycotts and getting manufacturers "up-against-the-wall," it is apparent that she has far more in common with the Friends of Animals, Inc., so expertly unmasked in your feature article, than she does with responsible conservation. In our free, competitive marketplace the manufacturer's products are merely a reflection of consumer tastes. She deplores our living standards and ways of life and such non-necessities as two cars, a dishwasher, etc., but what other factor but technology and its products has unchained man from the sole pursuit of food and shelter and made available to us all the recreational outdoor opportunities so long the privilege of the wealthy? Or would she have us wrap our parks and wilderness areas in the cellophane of restrictive legislation—to see from afar but not to experience with all our senses?

Her crowning absurdity is the linking of the environmental question to the Viet Nam War with the implication that no one genuinely concerned with conservation could possibly support our efforts there to preserve a nation's right to self-determination.

Her emotionalism about sparing our Christmas trees is reminiscent of "spare our wildlife" anti-hunting appeals and is far better suited to the pages of COSMOPOLITAN or McCALL'S than to MONTANA OUTDOORS.

Jack Sargent
Lynnwood, WA

MO IN THAILAND

For a native Montanan who has had to live away from the Big Sky Country for a long time, I want you to know how much I have enjoyed my subscription to MONTANA OUTDOORS. Particularly here in Southeast Asia, your magazine is a refreshing reminder of a different world back home.

I think editor Bill Schneider and his contributing writers are doing a great job in bringing factual and sensible positions on gun and predator controls to the public. Please keep this up. Also your many informative articles on Montana wildlife, conservation and related subjects.

Best wishes for your continued success.

Walter H. Martin
Bangkok, Thailand

recycled paper

EARTH DAY CONTEST

APRIL 22ND MARKS the third anniversary of Earth Day, a day set aside to give each of us an opportunity to become more aware of our environment.

There is much to be done to improve the quality of life in Montana, to change existing conditions through individual and group activities on Earth Day.

Much of the action on Earth Day will take place in classrooms, where students will be carrying out their own projects to express their concern for the deterioration of the environment.

This year, MONTANA OUTDOORS is sponsoring its first annual Earth Day contest for students of all ages.

Students may enter individually, by classes or by schools.

To enter, students can choose one of the topics listed here, or devise one of their own. Students must be sponsored by a teacher who should keep track of the student(s) progress, and when the project is completed, send us an evaluation of the project, including the results that have been achieved.

All entries should be mailed to MONTANA OUTDOORS, Department of Fish and Game, Helena, MT 59601. They must be postmarked no later than May 31, 1973. The winner(s) will receive a free one-year subscription to MONTANA OUTDOORS in addition to having their name(s) and a description of the winning project published in the magazine.

The projects will be judged on their effectiveness, whether they have changed existing conditions and their influence on local, state or national policy.

To assure the most effective, complete project, we suggest that students start well in advance of Earth Day. We hope the programs we have suggested will focus on development of ideas and activities that will grow and carry on, beyond Earth Day.

Some suggested topics:

● *Sponsor a recycling drive.* To make our natural resources go further and last longer, we can recycle materials such as metal, paper and glass. Recycling simply means using materials over and over, turning waste back into raw material.

Decide which presents the most serious problem in your area—aluminum, glass or paper litter.

Aluminum cans and other aluminum products can be sold to scrap metal dealers. Instead of disposing of them, call your local scrap metal dealer or your local distributing company to find out whether they will purchase the aluminum you've collected. If no dealer in your area will buy used aluminum, contact one of the following companies that have been cooperating in this venture: Reynolds Aluminum Co., P.O. Box 2356 LI, Richmond, VA 23218; Adolph Coors Company, 1321 Bannock St., Denver, CO 80204.

To get rid of shattered glass as well as no-deposit bottles, students should call bottling companies to obtain information about local glass recycling programs. If these companies do not recycle bottles, write their national offices.

Remember when you're gathering used glass, it must be sorted by color and all metal caps and rings (but not labels) removed.

Newspapers and magazines can easily be recycled. Most newspapers that are thrown away are burned in incinerators, destroying a reusable resource and adding to air pollution. A student effort can easily alleviate the problem of excess newspapers. To find a market for your paper, check

the telephone directory, contact your local offices of supermarket chains and inquire at your local service organizations.

Most scrap paper dealers will not take magazines because much of the paper is coated with materials that make it difficult to recycle. Instead of throwing magazines away, share them with neighbors, gather numbers of them and pass them on to libraries, service organizations and laundromats. Perhaps you can even use them at school for art projects.

Before you organize a recycling drive, here are some steps to follow:

a) Decide what reusable items to collect and make sure you have enough material to warrant collection.

b) Arrange for a large student work force to handle the material.

c) Make sure you have enough transportation. Your school system might donate a maintenance truck, or a scrap dealer who will buy your materials might supply his own truck.

d) Arrange for collection sites and storage areas. Ideal pickup places are schools, shopping centers, grocery stores, gas stations and churches. For storage, you might arrange to use an area of the city dump for temporary storage, or you could check with local plants to locate unused storage bins.

e) After your project is fully planned and organized, arrange for publicity with newspapers and radio stations. It is important to keep the community informed of the recycling activities.

f) Use the recycling symbol to publicize your activities.

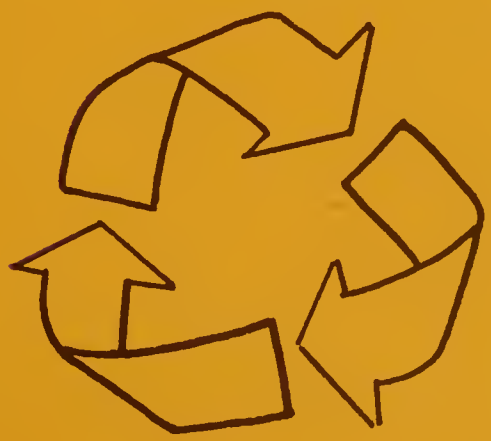
● *Write your elected officials.* Students can write letters to legislators expressing concern for pending environmental legislation, or even propose new laws.

Since the Montana legislature will be meeting January 1st in Helena, students could decide which proposed legislation to support or oppose and write letters to legislators. Include local editorials or clippings if they are pertinent. Then, your class could plan a trip to Helena to observe the legislative process and, at the same time, follow action taken on the environmental bills.

Why not keep a chart on statements made by politicians concerning matters of environmental legislation? Check their statements with their actions and see if they contradict. To find out how legislators have voted on environmental bills, write the Montana State AFL-CIO, P.O. Box 1176, Helena, MT 59601. Two national organizations that tabulate voting records are: Consumer Federation of America, 1012 14th St. N.W., Washington, D.C. 20005; The League of Conservation Voters, c/o Friends of the Earth, 917 15th St. N.W., Washington, D.C. 20005.

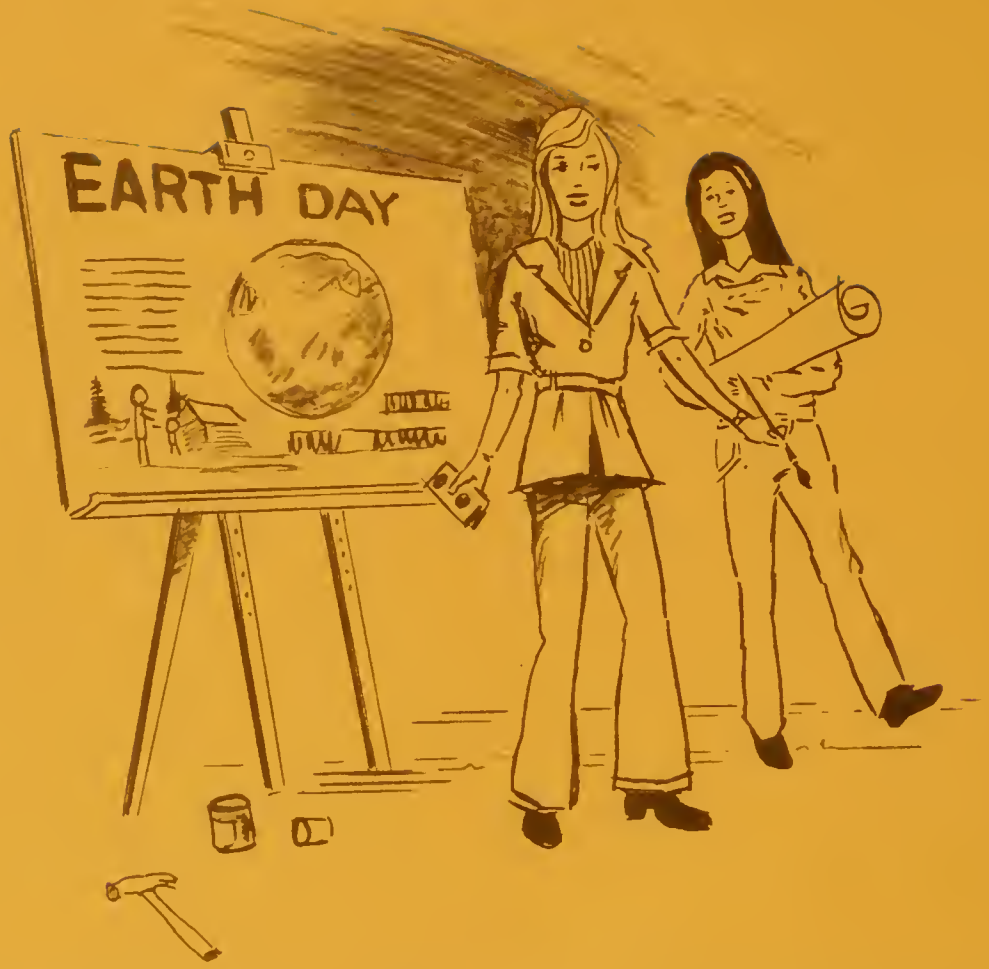
Students can also join local, state or national groups that are working for a better environment. In Montana, some of the groups students could

This is the symbol of ecology, which represents a fusion of the letters "e" and "o". The "e" represents earth and the "o" represents the oneness of the earth.



This symbol is used for recycling and was designed by Gary Anderson for a contest sponsored by The Container Corporation of America.

recycled paper



contact are: Montana Wildlife Federation, 410 Woodworth, Missoula, MT 59801; Montana Conservation Council, Inc., Box 175, Missoula, MT 59801.

If students would rather approach a national organization, some include: the Sierra Club, 1050 Mills Tower, San Francisco, CA 94104; Friends of Earth, 30 E. 42nd St., N.Y., NY 10017; Consumers Education and Protective Assn., 6048 Ogontoy Ave., Philadelphia, PA 19141.

Students can also petition their city council to support action on local environmental questions.

● *Petition your city council for bicycle trails.* To turn further away from motorized transportation and to insure safer roadways for bicyclists who are now crowding our already overcrowded highways, urge your city officials to develop bike trails throughout your city. Present a petition and designate one student as spokesman for the group.

Bicycles are one of the most economical, convenient and pollution-free means of transportation, and a strong student effort in this area could be instrumental in bringing bicycle trails to your city.

Also, see that city government takes bikes into account when designing for traffic flow, building parks and streets.

● *Write companies concerning their advertising claims.* If you've watched television at all, you have seen advertising claims from companies encouraging us to purchase their allegedly pollution-free products. Write some of the major utility companies and oil companies and ask them to substantiate their claims.

Generally, the public neglects to question ads and accepts what is presented to them as the truth. Find out if the products and developments that companies claim to benefit the environment are really destroying the environment.

The problems of cleaning our environment are enormous, but there are a lot of concerned people like you who, in small and large ways, are working to change things. Let's not just make this simply an effort that will end on Earth Day, but an effort that will grow in momentum until the public outcry is one that can't be ignored, and substantial changes are made in the country's environmental policy—*Toni Jensen*

EDITOR'S NOTE: Much of the material found in this article was taken from "Everyman's Guide to Ecological Living" by Greg Cailliet and others, The Macmillan Company, New York and "The Environmental Handbook" edited by Garrett De Bell, a Ballantine/Friends of the Earth Book, New York.

nature's place for predators

by Ken Walcheck

THE PREDATOR'S ACTUAL role in that well known but poorly understood equation, "the-balance of nature," is often painted with a broad brush. Protectionists paint it white; predator-haters paint it black.

But in reality, the predator's character is shades of mottled gray encompassing a broad spectrum which takes on many shapes and forms.

It is difficult, for example, to explain the apparent contradictions in the many, well-explained case histories and the complexities in the timeless struggle of the eater and the eaten. Predation is a diverse subject, cutting across the entire field of wildlife ecology and management. When it comes to broad descriptions and the precise role of the predator in nature's scheme, we are all, from the most astute biologist to the most amateur bird-watcher, in the position of blind men trying to describe an elephant. We get a tail here, a trunk or ear there, but the whole is too great for our faculties, imagination and intellect.

the past explains the present

Paul L. Errington was internationally known for his work on predator-prey relationships in marshes in north central United States until his death in 1962. He was very aware of the broad spectrum of predator-prey relations, and realized one had to look beyond the fact that a predator and a prey species occur on the same land unit. The limits of predation are implicit in his statement on waterfowl," . . .our native predator-prey relationships have been subject to nature's experimenting for millions of years, and they have been living with many of the same hazards that they now have. That being the case it may be that in the end much of the loss does not count."

photo by Alan Nelson

The predator and his ancestors have existed in North America for millions of years, surviving glacial periods and drastic environmental changes. We must fully appreciate these long-standing adjustments when talking about predator/prey interactions. Those remaining have stood the test of time and the test of each other.

Predation is not necessarily an undiluted evil for prey species. To a given animal, for example, death may appear in many forms. It may pounce suddenly with red fangs or talons, or it may creep in slowly and agonizingly as a fungus infection of the lungs, a dwindling food supply, a freezing rain or a drying pond. But whatever guise death takes, it increases its toll as an animal population grows. When the breeding potential of a species pushes the population past the carrying capacity of its habitat, the environment reacts with counter pressures which trim the excess population.

Unfortunately, prey vulnerability has been greatly oversimplified in many of our minds and as a result, we think predators act as sanitary

agents and feed only on the diseased and the sick. Prey vulnerability frequently does involve the "sick and weak," but as a matter of statistics, the incompetent, the too-numerous and the unfortunate are weeded out, too, and the mechanisms of evolution continue to operate as they have since the beginning of life.

the predator within the community

A study of wildlife populations in various habitats will reveal that practically everywhere, even in the most artificial environments, animals live in communities complete with herbivore and carnivore components. Within such communities there is a fluctuating balance between species; it changes and adapts as conditions vary. It involves such dynamic and competitive elements as vegetation, disease, parasites, herbivores and carnivores, and it exists within the limitations imposed by weather. This, then, is the spectrum in which the predator operates.

It can be safely said that most biologists accept the thesis that predation among most vertebrates is secondary to other population controls and must be studied from a community viewpoint. This has been done in an interesting manner by Paul L. Errington in his long-term studies of muskrat populations in Iowa. He found muskrats were fairly secure from mink under favorable conditions of food, water and health. But when marshes flood or dry out, or disease spreads in the population, the first indication of trouble is increased success in muskrat hunting by mink.

Errington's views were most strongly molded by his experience with the single predator-prey interaction between mink and muskrats. Again, these animals live in a special, marshland habitat that is often beset by environmental crises—drought years, hard winters with deep freezing, early spring thaws followed by refreezing. These crises overshadow biological (mink predation) controls and reduce muskrat populations far below the carrying capacity of the habitat in favorable years. Errington emphasized that it was the "biological surplus" of transient, unsettled muskrats after dispersal to the spring breeding ranges that were particularly subject to predation or other mortality. Settled muskrats were relatively safe.

The chances of a particular prey species' capture vary with the predators present. As the prey species declines, it becomes less vulnerable to those predators most poorly adapted to capture it. Specialized predators, those adapted to hunt only a few species, are forced to move when the prey's vulnerability drops to a point where the predator population cannot support itself. Snowy owls, as an example, are forced southward to more productive feeding areas when the lemming population drops. Generalized predators, with unrestricted diets, adjust to other food sources. The horned owl has a large range of prey available to it. And the fox can shift to a vegetable and carrion diet.

Consider the interaction of the predator and alternate prey. Although the predator may have a strong preference for a particular prey, it can, in time of relative scarcity, switch to an alternate, more abundant species. If mice, for example, are more available than rabbits or upland game birds, coyotes and hawks will concentrate on them. These alternates, often called "buffer species," stand between the predator and the game species. As an example, Hanson and Smith, two waterfowl biologists, found that foxes in the Hudson Bay region preyed on Canada geese more heavily in years of mouse and lemming scarcity than in normal years when the rodents were abundant. The rodents served as "buffers" to absorb some of the predation directed toward the geese.

It is *not* the predator that limits prey populations, *but the prey who limits the predator.* The snowy owl has no buffer species between it and the lemming. When the lemming becomes scarce, the owl is forced to move on.

of what value are predators?

Several investigations have demonstrated that, in some cases, the often-repeated idea that predators take the weakest is no fable. The predator selects the old and the very young and animals rendered vulnerable by other physical conditions. This is evident in several studies of the wolf and various prey animals in North America, notably the Dall sheep and caribou in Alaska, deer in Algonquin Park, Ontario and moose in Isle Royale, Mich.

One of the best examples of "sick and weak" predation involves the work of Adolph Murie and his study of wolf predation on Dall sheep in Mt. McKinley National Park in Alaska. In the examination of more than 800 sheep skulls, Murie found that most of the fatalities were either very old or very young. Murie theorized the wolves constantly screened the sheep for potential victims. He notes, "It is my impression that the wolves course over

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the hills in search of vulnerable animals. Many bands seem to be chased, given a trial, and if no advantage is gained or weak animals discovered, the wolves travel on to chase other bands until an advantage can be seized. The sheep may be vulnerable because of their poor physical condition due to old age, disease or winter hardships."

In a similar study on the dynamics of a mountain lion population and its impact on big game populations in an Idaho primitive area, Maurice Hornocker found lion predation had some important and far-reaching effects. Although he concluded that elk and deer populations were limited by the winter food supply and that lion predation was inconsequential in determining the ultimate number of deer and elk, lions were beneficial in other respects.

Hornocker found the mountain lion played an important role in distributing deer and elk on restricted and overused winter range. In his intensive study, he noted that big game animals were not overly disturbed by the presence of a lion in the same locality. A different behavioral reaction was noted, however, when a kill was made. Both deer and elk were observed moving out of the vicinity and in some cases they even moved to different drainages. It is apparent, then, that in this particular area the mountain lion kept deer and elk moving on the winter range. Such predation is considered necessary in an ecologically stable wilderness environment.

Another favorite theory of predation is "pest control" . . . coyotes eating rodents, for example. Predation is only one of the mortality factors limiting the number of plant-feeding rodents. Predators do eat rodents, but many unknowns challenge their effectiveness—especially when man enters the picture. Taking this a step further, let's assume that an increase in rodents on poor range brings about an increase in coyotes. However, coyotes are controlled for killing sheep. As a result, the rodents coyotes didn't eat must be poisoned before the range can be improved. Man has the ability to obscure the potential roles of both predator and prey, roles that would function in a more natural situation.

A somewhat unexpected benefit in the complex predator-prey equation has been suggested by B. W. Cartwright, a Canadian biologist of long experience in the prairie provinces. He reasons that a light to moderate degree of predation upon egg clutches may serve as a biological safeguard for single-brooded prairie grouse and waterfowl. If, in regions with occasional climatic emergencies, a species was undisturbed by predators and synchronized hatchings so that all its young were born at one time, that species could lose its entire season's reproduction to late spring floodings, freezing or similar calamity. Predators provide insurance against such mass catastrophies by destroying some of the first nests and forcing hens to lay replacement clutches and stagger the nestings over a longer period of time. Thus, the predator's destruction of a clutch of eggs or the death of a nestling does not always signify less game birds in the fall. The losses may be compensated for by renesting efforts or by automatic balancing of mortality rates. Within limits, a destroyed clutch may mean another bird has a better chance to live.

Another indirect benefit attributed to predators is the healthy condition of the prey species. Many agree predators improve the genetic fitness of their prey, and this produces a higher quality of alertness and escape for the sportsmen. George B. Schaller, renowned animal ecologist, studied the effect of lion predation on prey populations in Africa and summarized the endless contest between predator and prey and the resulting evolutionary effect: "The fleetness and alertness of prey are products of constant environmental resistance including predation that has weeded out the stolid and the slow. There is a continual, evolutionary race between predator and prey. As a prey species develops some slight advantage in its race against death, a predator promptly finds a way to overcome it. But it is a race that can have no winner."

Predators are a part of virtually all ecosystems, and they include among their numbers the direct ancestors of man back to the era of *Homo habilis*. As S. Eimeral and I. DeVore, authors of **The Primates**, have emphasized: "It would be hard to exaggerate the importance of predation—or hunting—in the development of man. Together with bipedalism and the use of tools, hunting . . . set him [man] on the evolutionary path that was to lead, ultimately, to his position of dominance over all animals."

Regardless of his evolutionary background, man has shown little affection for most predators. He has labeled them as dangerous and undesirable competitors and has inferred they have no place in nature's way of life. Most biologists, supported by a mass of good data, disagree and contend predators serve a necessary function in natural and semi-natural communities. But misguided attempts to eradicate these animals still continue in many areas. In spite of man's resentment, most predators compete successfully with him and defy human efforts of extermination.

There's at least one wise old whitetail buck in Pennsylvania who doesn't need those deer crossing signs on the highway. A game warden watched him crawl through a 20-inch diameter drainage conduit underneath a busy highway rather than risk the traffic. Especially wise of him since some 22,000 deer are killed by vehicles in that state each year.

someone has been tracking up your land

SNOWMOBILES ON PUBLIC LANDS. DO THEY BELONG? SHOULD THEY BE REGULATED? OR SHOULD THEY BE BANNED?

BY GENE COLLING

BRING UP THE subject of snowmobiles and you will likely get a love'em or hate'em reaction. With an estimated 60,000 snowmobiles competing for the use of Montana's public lands with backpackers, ice fishermen, skiers and wildlife, inevitable conflict arises.

Les Line, editor of AUDUBON, leaves little doubt about what he would do with the snowmobile. "If it were within my power, the abominable snowmobile would be banished forever from private ownership for recreational purposes."

Countering is Dr. James D. Perry, president of the United States Snowmobile Association Central Division. "The real problem in regulating snowmobiles is not primarily the vehicles but rather the people who operate them."

Undoubtedly, snowmobiling is an exciting way for many people to enjoy public land in winter. Winter, however, is a very fragile time for natural ecosystems, and sometimes even a slight tremor can cause the complex network to collapse.

harassment of wildlife

A major complaint is harassment of wildlife on winter ranges, areas especially sensitive to disruption. Generally, harassment is unintentional, the result of trying to get a photograph or a closer look. But cases of intentional damage are reported each winter and, like the unethical hunter, cause the sport to be judged by the actions of a few. (Montana Fish and Game Law forbids "driving, rallying or harassing any of the game animals, game birds, or fur-bearing animals of the state" with snowmobiles.)

Reputable snowmobile clubs and publications urge riders to give a wide berth to wildlife. Part of the snowmobiler's code of ethics states, "I recognize that people judge all snowmobile owners by my actions. I will use my influence with other snowmobile owners to promote sportsman-like conduct."

The snowmobile competes with other winter activities for land use and therein lies the problem. The machines need lots of land to roam, so Montana's public lands are made to order. The regulation of snowmobiles on "your land" varies from state to state and agency to agency, but for the most part is non-existent.

State-owned game ranges in Montana are closed to snowmobile travel from December 1st to May 15th. On other state lands, the leasee has the power to open or close snowmobile traffic.

But much snowmobile travel is done on U.S.

F&G photo by Bill Schneider

snowmobiles continued

Forest Service land. In the past, motor vehicle use on national forest lands in Montana has been practically unrestricted, except for wilderness or primitive areas where all motorized vehicles are banned. But conflicts, stemming from unrestricted use, made it necessary to regulate off-road vehicles. Executive Order No. 11644, signed by President Nixon on Feb. 8, 1972 and entitled "Use of Off-Road Vehicles on the Public Lands," directs federal agencies to insure control of off-road motor vehicles to protect public land resources, to promote the safety of all users and to minimize conflicts between the various uses.

In compliance with the order, the six Montana national forests east of the Divide will close most of their lands to cross-country travel prior to the 1973 recreation season. This closure, according to Helena National Forest supervisor Robert Morgan, does not apply to snowmobiles now, but will in the near future.

"Probably the prime reason for the closure is that most people consider solitude a major attraction of the forest environment and . . . travel by motorized vehicles transforms the solitude into annoying and even harassing noise and traffic," Morgan notes. "If there is one thing that has come through loud and clear in public meetings over the past two years, the public wants the forest closed to cross-country vehicle travel . . ."

The Bureau of Land Management (BLM) and the Bureau of Reclamation are also affected by the executive order. But as yet, they have not come out with any restrictions on off-road vehicles, with the exception of banning snowmobiles on big game winter ranges. National parks like Glacier and Yellowstone require snowmobilers to sign in and stay on designated snow-covered roads.

Decibel Scale of Sound

140	**PHYSICAL DAMAGE**
130	jet take-off
120	**PAINFUL**
110	rock music
100	**DEAFENING**
90	heavy city traffic
80	**VERY LOUD**
70	cocktail party
60	**LOUD**
50	average traffic
40	**MODERATE**
30	normal conversation
20	**FAINT**
10	rustling leaves
0	

Obviously more and more public land will be closed to snowmobiling in the future, so the snowmobiler may be asking, "What's left for me?"

A heavily used snowmobile trail to Park Lake in the Helena National Forest, Forest Service photo by Wayne Phillips.

Special snowmobile trails seem to be one answer. The Lincoln district of the Helena National Forest has 12 snowmobile routes ranging in length from 5 to 16 miles. The BLM has established more than 100 miles of marked trails near Garnet, Mont. And Gallatin Big Sky Snowmobile Trail south of Bozeman offers a scenic path that winds down to Yellowstone Park. Benefits of the trail system? It's safer for both the operators and the environment, provides scenic routes and concentrates snowmobile use—thus minimizing conflict.

noise—a basic problem

Polar opinions can find agreement on one issue concerning snowmobiles. That's the noise they emit —it's too loud. It disrupts a normally silent environment, harasses wildlife on limited winter ranges, irritates backpackers, fishermen and skiers and damages the hearing of the operators.

Faced with increasing pressure from conservationists and buyers, manufacturers have made a token effort to silence the 1973 models. The industry has set a voluntary maximum noise level of 82 decibels. Some models are quieter, and a few have dB* ratings in the low 70's.

The effect of snowmobile noise on hearing was studied by Dr. Robert B. Chaney Jr. of the University of Montana's Department of Speech Pathology and Audiology during the 1971-72 winter near Lolo Hot Springs, Mont. Noise measurements were made to evaluate at-the-ear noise levels. Some were as high as 115 dB-A*, roughly comparable to a police siren and in the painful hearing range. Operators were tested before and after snowmobile use, and in almost all cases, hearing loss was detected.

Dr. Chaney concluded from his studies that " . . . Three-fifths of the tested population experienced temporary hearing loss from snowmobile noise from normal use, normal use being 2 to 4 hours per day, 2 or 3 times a week." The researcher is concerned because " . . . Any noise that causes a temporary hearing loss is capable of causing a permanent loss."

He discovered that young operators were especially susceptible to ear damage and recommended helmets and ear plugs to protect against hearing loss.

The Montana Fish and Game Commission has established a noise level for snowmobiles sold after June 30, 1972 of no more than 85 dB-A at 15 feet. Most of the snowmobiles manufactured prior to the 1973 models exceed 85 dB-A at 50 feet.

out-racing environmental study

In characteristic American fashion, the snowmobile boom far out-raced environmental study and regulation. Now some study has been completed and environmental damage (i.e. seedling destruction, animal disruption, erosion) is known to occur. Some would like to see the recreational use of snowmobiles banished completely, but that view is unrealistic. Snowmobiles are definitely here to stay, but snowmobilers, for their part, must accept regulation and restrictions as a necessary step to public land enjoyment.

Possible actions include:

—areas with fragile winter ranges should be off-limits and all other travel restricted to trails and snow-covered roads.

—manufacturers should be pressured to produce quieter and safer machines.

—firearms of any type should be prohibited on the machines. (Montana Fish and Game Law prohibits the "discharging" of firearms from or upon a snowmobile.)

—oversized serial numbers should be imbedded in the tread to leave an impression in the snow to discourage vandalism, littering and game harassment.

If the people with opposing views will concede that snowmobiling is a legitimate use of public lands but that restrictions are necessary, both groups can co-exist on Montana's vast winter playground.

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* A decibel is a measure of the difference in power of two sounds and is expressed as "dB." Zero decibels is the threshold of hearing. There are several decibel scales and the "A" scale is used to rank sound volume in relation to the human ear. It is a logarithmic scale which means the 90 dB-A rating of heavy traffic is not twice as loud as the 45 dB-A rating of voice conversation but actually thousands of times louder. A simple logarithmic example might be to compare 10^2 and 10^4. 10^2 equals 100, but 10^4 equals 10,000, a number many times larger. For the mathematicians, dB=10 $\log_{10}$ a/b.

Next Time

Watch for these features in the March/April 1973 issue of MONTANA OUTDOORS

—Montana coal (part 2) coal and the environment

—wilderness designation for the Absaroka?

—pesticides and the Flathead Lake osprey

—the black bear

—the changing role of the fish hatchery